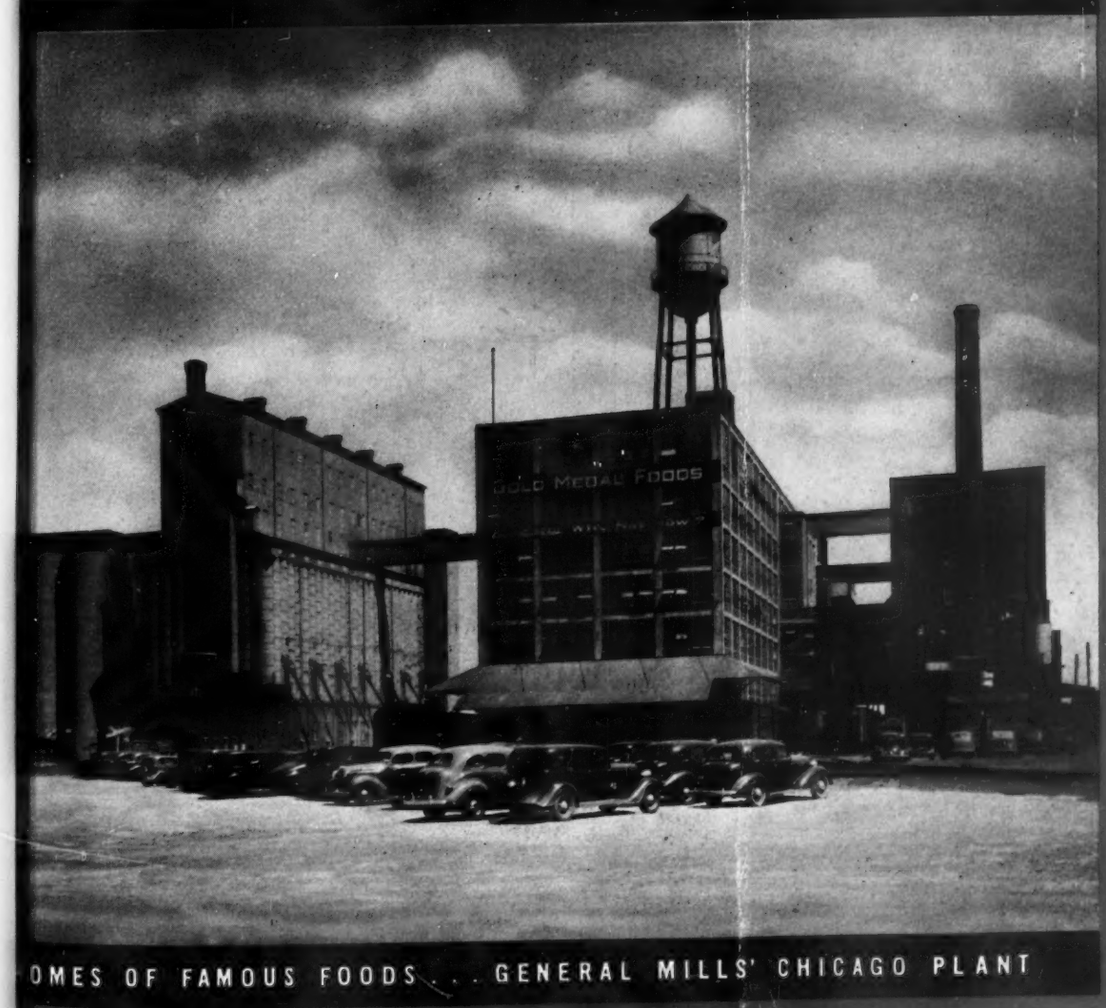
JULY 1940

# FOOD INDUSTRIES

JUL 9 1940




OMES OF FAMOUS FOODS . . . GENERAL MILLS' CHICAGO PLANT

IN THIS ISSUE:

Technologists Discuss Food Problems

Flavor versus the Number of Bacteria

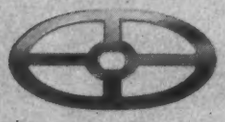
Continuous Process for Making Jelly

Claims That the FTC Won't Let You Make

Rentschierizing Finds New Applications

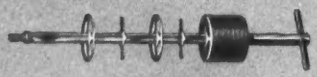
McGRAW-HILL PUBLISHING COMPANY, INC.

## HERE'S THE FILTER CONSTRUCTION THAT KEEPS FLUIDS FLOWING

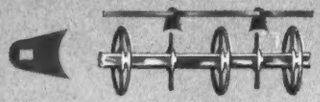


**1** This is one of a stack of *discs,* held apart by

**2** *Spacers,* whose thickness determines the desired degree of filtration.



**3** Discs and spacers are mounted on a *central rotatable shaft* which has a convenient handle.



**4** Mounted on a stationary rod alongside shaft are *cleaner blades,* slightly thinner than spacers, extending into the slots between discs.

**5** Fluid containing the solids passes between the discs, and the solids larger than the aperture are retained on the outer edges.

**6** Turning the handle rotates the discs past the stationary cleaner blades, combing out accumulated solids. They fall into the sump, ready to be drained whenever it is convenient.

# *This Also Happens to Fluid Flow... But You* **CAN** *Prevent It*

A Cuno Filter keeps fluids flowing *continuously* — without expense of duplex installation to avoid production stops for filter cleaning.

Merely turning a handle saves all the costs of downtime and maintenance. Cleaning takes place while the filter is working, straining out unwanted solids from fluids of all types.

"80 Ways to Make More Money" is a free booklet describing a wide variety of money-saving applications, including air and gases. There's a coupon for your convenience in requesting it.

### THE "CANDY KID" GROWS OLD

Installed years ago to remove lint and other solids from chocolate used in a famous candy bar, a Cuno Filter has been so successful that other Cuno Filters have been put to work on other applications.

The original Cuno Filter is still operating—evidence of its dependability even under high-production requirements.

Perhaps fluid flow is your responsibility. Our filtration engineers have worked with countless firms to solve filtration and straining problems. What is *your* problem?

**KEEP ON GO WITH CUNO**

**CUNO ENGINEERING CORPORATION**
317 South Vine Street, Meriden, Conn.

Please send me, free, "80 Ways to Make More Money."

Name .....

Company .....

Street .....

City ..... State .....

# FOOD INDUSTRIES

DISTRIBUTION PROCESSING

PUBLISHED MONTHLY

A McGRAW-HILL PUBLICATION

M. A. WILLIAMSON
Publisher

LAURENCE V. BURTON
Editor

E. S. STATELER
*Associate Editor*, Chicago

G. L. MONTGOMERY
*Associate Editor*

IVAN C. MILLER
*Distribution Editor*

F. K. LAWLER
*Managing Editor*

R. S. McBRIDE, Washington, D. C. · PAUL WOOTON, Washington, D. C. · N. A. BOWERS, San Francisco, Cal. · S. T. HENRY, Spruce Pine, N. C.

EARLE MAULDIN, Atlanta, Ga.

ARTHUR S. ALLEN, Consulting Color Editor


## Contents for JULY 1940

VOLUME 12 • NUMBER 7

### FOOD TECHNOLOGY

*New Discoveries and Inventions*


**Food Technology**
Sanitary Significance of Coliform Bacteria in Food Control ..... 94
Coli Bacteria in Nut Meats ..... 94

**Food Engineering**
Vinylite Resins for Container Linings ..... 94

**Bakery Products**
Determining Rye Bread Aroma ..... 95

**Beverages**
"Needling" the Ersatz Coffee ..... 96

**Canning and Preserving**
Texture of Tomatoes Improved by Calcium .. 96
Canned Fruit Juices ..... 96

**Dairy Products**
Chlorine Rinse Removes Bacteria ..... 97
Cooked Flavor in Milk and Iron Contamination. 97
Extracting Whey Powder with Alcohol ..... 97

**Fish**
Germicidal Ice ..... 98

**Flour**
How to Can Flour ..... 98

**Frozen Foods**
Freezing Quality of Irrigation-grown Fruits and Vegetables ..... 98

**Meat Products**
Ripening of Felino Sausage ..... 98

**Pickling**
New Method of Preventing Scum-forming Yeast Growth ..... 99

**Miscellaneous**
Vitamin C Enrichment of Foods ..... 100

**Correction**
Gelatine and Sodium Alginate to Stabilize Ice Cream ..... 94


### ★HOMES OF FAMOUS FOODS

An important plant in the milling industry is the one in Chicago which produces "Gold Medal" products. Shown on the cover, it is operated by General Mills, Inc., whose headquarters are in Minneapolis, Minn.

### THIS MONTH

#### PROCESSING


**Meeting of Institute of Food Technologists** ..... 39

**So All Your Troubles Are Distribution Problems?** ..... 42
*By L. V. Burton*

**What Is Satisfactory Bacteriological Quality in Foods?** ..... 44
*By M. E. Parker*

**Make the Cockroaches Walk the Plank** ..... 47
*By Eric Hardy*

**The Facts About "Artificially" Ripened Fruit—Part I** ..... 48
*By Norwood C. Thornton*

**Ultraviolet Finds New Applications** ..... 51
*By T. R. Porter*

**Making Jelly by Continuous Process** ..... 54
*By George L. Baker and W. D. Pheteplace, Jr.*

**How To Get the Most out of Your Lights** ..... 56
*By S. H. Coleman*

**Flow Sheet for Carbonated Beverage Manufacture** ..... 57

**What Is Good Lighting?** ..... 58
*By Harris Reinhardt*


#### DISTRIBUTION


**Claims the FTC Won't Let You Make** ..... 61
*By Nathan R. Abelson*

**Hints and Hurdles** ..... 63

**Chip Steak Creates Acceptance for Quick Frozen Meat** ..... 65
*By Ivan C. Miller*

**New Packages and Products** ..... 66

**Truck Bodies Dressed Up To Aid Food Sales** ..... 68


### EVERY MONTH


**Talk of the Industry** ..... 35
**Automotive** ..... 68
**The Food Industry News** ..... 70
**Business Trends** ..... 77
**Men, Jobs and Companies** ..... 82
**Catalogs** ..... 86
**Food Equipment News** ..... 88
**Food Technology — Abstracts** ..... 94
**Books** ..... 101
**Patents** ..... 102
**Formulas for Foods** ..... 104



McGRAW-HILL PUBLISHING COMPANY, INC.

JAMES H. McGRAW, Founder and Honorary Chairman

*Publication Offices:* 99-129 North Broadway, Albany, N. Y. *Editorial and Executive Offices:* 330 West 42d Street, New York, N. Y.

Branch Offices, 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, JR., President · HOWARD EHRLICH, Executive Vice-President · MASON BRITTON, Vice-Chairman · B. R. PUTNAM, Treasurer · D. C. McGRAW, Secretary · J. E. BLACKBURN, JR., Director of Circulation

Published monthly; price 35c. a copy. Allow at least ten days for a change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42d Street, New York, N. Y. Subscription rates: United States, Canada, Mexico and Central and South American countries, $3 for one year, $4 for two years, $5 for three years. Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $10 for three years. Entered as second-class matter Aug. 17, 1936, at the Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, N.Y." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index.

Copyright, 1940, by McGraw-Hill Publishing Company, Inc.

# *In* THIS *Issue*

**• YOU CAN'T SAY THAT**

Because the Federal Trade Commission won't let you. We're talking about food advertising claims that have been tabooed by the FTC. A two-page check-list of outlawed claims starts on page 61, and two more pages will be published in the August issue of FOOD INDUSTRIES. The tabooed claims include some for yeast foods, bread, candy, coffee, flavoring and coloring, malted milk, malt sirup, meat, meat tenderizer, olive oil, salt, sea food, fruit juice, oleomargarine and root beer.

**• WHICH SIDE ARE YOU ON?**

There's an argument—or shall we say a cool difference of scientific opinion—between health authorities and food technologists as to the number of bacteria versus flavor in foods. The health authorities in many cases judge food by the bacteria count, without regard to what kind of bacteria they are. Some food technologists maintain that certain bacteria are harmless, or even useful. An outstanding technologist airs his views on this on page 44.

**• RENTSCHLERIZING—AGAIN**

The first published information on the use of bactericidal irradiation in the food industries appeared in FOOD INDUSTRIES in 1936. As more was learned about this new technological tool and more applications were made, subsequent articles were published in 1937 and 1938. Now it's time to say some more. See page 51 for the latest on ultraviolet in the meat, baking, dairy, fish and fresh fruit and vegetable industries.

**• NOT FOR YOU—FOR YOUR NEIGHBOR**

Of course you haven't any cockroaches in your plant. But there are some in the plant next to yours, and from there they will migrate to your premises. So you'll save yourself a lot of trouble if you will read the article on controlling cockroaches on page 47 and pass the information to the manager of the plant next door.

**• ILLUMINATION ON LIGHTING**

What is good lighting? Don't guess. Turn to page 58 and find out. T. R. Porter, of Westinghouse, not only tells you what it is but how to attain it. And he gives specifications for food plant conditions and food plant operations. The new fluorescent lighting is discussed.

# *In* FORTHCOMING *Issues*

**• NEW BIRDSEYE FROSTER**

Clarence Birdseye, the well-known pioneer in the quick freezing of foods, will soon announce a new "gravity froster." How this operates and why will be told by FOOD INDUSTRIES as quickly as the information becomes available, probably in August.

**• BLITZKRIEG ON RODENTS**

Everyone is sick of hearing about war-time blitzkriegs. But this concerns one for peace-time use against one of man's worst non-human enemies. The article will outline practical methods for rodent extermination which are suitable for use in food plants and warehouses. The author, Eric Hardy, is a British authority on war against rats. Coming soon.

**• LATEST ON TREATING MILK WASTE**

Discharge of liquid waste from dairies, creameries, cheese factories and other milk establishments into roadside ditches and streams has resulted in nuisances and serious pollution conditions. Sometimes costly litigation has been the result. New developments in the treatment of milk wastes to avoid such conditions will be described in an early issue. The author is L. F. Warrick, Wisconsin state sanitary engineer.

**• WAR CHANGES FOOD PROCESSING**

Marching armies change more than geographical boundaries. And in England and France new methods have been devised by the food industry under pressure of war-time demands. These changes will be discussed in an article to be published soon.

**• GAS AIDS REFRIGERATION**

Fresh fruits and vegetables keep better in refrigerated storage when the air of the room is modified in respect to the proportions of carbon dioxide, oxygen and nitrogen. What the proper proportions are and how to attain them will be told in an article by H. H. Plagge, Iowa Agricultural Experiment Station. The disadvantages as well as the advantages of gas storage will be discussed.

# FOOD INDUSTRIES

**DISTRIBUTION • PROCESSING**

Established 1928 — McGraw-Hill Publishing Company, Inc.

LAURENCE V. BURTON, Editor

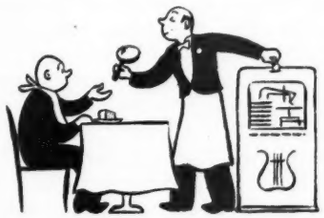
Volume 12, Number 7 July 1940


# The Talk of the Industry

» AMERICAN war psychology is very strange and unpredictable. Now that a shooting war has replaced the sit-down war there is little evidence of a sudden demand for sugar.

» WHEN COMMENTING on a food case, "U. S. vs. 45 Cases of Limburger Cheese," in which it had been shown that the product contained insect fragments, a Detroit district judge felt that a consumer has a right to expect freedom "from such noisome articles, and objects and substances as appear to be in this cheese . . . . .

"Otherwise, besides the annoyance that might ordinarily accompany the consumption of Limburger cheese, they would also have to provide themselves with microscopes or magnifyng



glasses. In fact, in the future the restaurants might advertise 'With music and magnifyng glasses.'"

Apparently the court does not relish Limburger.

» VAGARIES of regional preferences for foods are always a mystery. How do people get that way? Why does the New York market require pale butter? Why do Bostonians buy only brown eggs? Why do people in the Missouri Valley seem to prefer a blend of coffee that couldn't be sold on the Atlantic Seaboard? The list is endless. The only explanation that, up to now, seems plausible is that the folks never have had a chance to find out what they were missing.

» NOW THAT fifth column jitters are about to afflict us, we may as well prepare ourselves also for glass-in-foods jitters which affect even the professional military mind. Well do we recall the day about 22 years ago when the general commanding a division in the field sent us an unopened 1 lb. jar of peanut butter from his own mess with instructions to "analyze it for glass." The only available apparatus was running water, a wash basin and a tumbler. No books, no *Official Methods of the A.O.A.C.* Nothing.

But never let it be said that a food technologist can be stumped. We extracted a heaping teaspoonful of broken glass from the contents of the jar by the process of chewing up every bit of the 1 lb. sample. A positive report was made to the general and the broken glass was sent along in an envelope to substantiate it. It must have given the old gentleman a bit of a jolt and a conviction that the foreign agents were hitting below the belt, for two days later he sent us a loaf of bread with a deep brown spot in the middle. This, too, was to be "analyzed." Several well-known chemists conferred and wondered how to proceed on such a task with no more facilities than an army bathhouse afforded. Food technology solved it. This time the lip test was utilized which, if you must know, is a modified form of cautious tasting. The brown spot was applied to the lower lip. All the skin came off in a few seconds, thereby "proving" it was a caustic alkali, presumably washing soda or lye. It is reported that there was much sorrow in the division baking company next day.

Next, the general sent an unopened

package of rolled oats, also from his own mess, to be analyzed for glass. With the aid of a newspaper and a bent pin stuck into the eraser of a pencil, each flake of the cereal was carefully hooked away, revealing in all about six small pieces of broken glass. Such were the horrors of war.

It won't be long now before the broken-glass jitters will be with us.

» WHAT is the food business?" is a question that arises with regularity and is confusing to many. The most recent contribution to the confusion comes from the research department of a large bank. It insists, that for practical purposes, a soap maker is a food manufacturer. Other oddities of this sort, emanating from financial houses, are the inclusion of bottle and can companies with the food industries, though up to now the carton and

paper package people have been omitted.

Why not include also makers of refrigerating equipment, for about 90 per cent of all industrial refrigeration is for food preservation? Or manufacturers of leather, or glue and sandpaper, or bottle closures, or seeds, or fertilizers? Apparently there is no logical limit unless you exclude all industries whose finished products are not edible.

### *National Defense—Everyone's Job*

EVENTS have followed one another with such rapidity these last few weeks that their impact has finally battered the people of the United States into consciousness of the needs of national defense. Aroused public opinion has brought action from the government and expansion of defense forces, material stocks, and industrial capacity has commenced in earnest.

From now on, preparations for national defense should proceed swiftly and surely. Direction of the job has been placed in the hands of capable men, including Knudsen of General Motors, Stettinius of U. S. Steel and Francis of General Foods.

But these men alone cannot do the job—they can only direct it. National defense is everyone's job. Let's go to work at it, calmly and thoughtfully, certain in the knowledge that the cost of success in time, effort and money will be infinitely less than the cost of failure. Keep always in mind that what is needed is forceful cooperation, not well-intentioned but uncoordinated activity. And finally, stay out of Washington unless your presence there has a definite purpose.

### *Is the Food Industry Prepared?*

A QUICK VIEW of the industrial picture from the viewpoint of national defense gives the impression that the food industry is well prepared for "M" day. But thoughtful food company executives who are familiar with the industrial mobilization plan are not so sure. A few quick moves in the East Indies resulting in the cutting of important tin resources could easily alarm many a food company.

Another important feature of a possible "emergency" will be the shifts of food demand. Some foods will be in greater demand, but others will be in much less demand.

Get out your June, 1939, FOOD INDUSTRIES and study it over. There you will find a careful analysis of the role the food industry must play in an emergency. (A few reprints are still available.) At a time like this executives have two important obligations: To prepare for their part in the defense program; and to safeguard their own company against losses due to the impending shifts of demand.

Another factor to be considered is increased demand for food from European countries. Millions of people have suddenly become dependents instead of producers.

In the long view the problem of packaging foods is likely to become the most perplexing. If your concern has no packaging laboratory, now is the time to install one and get it functioning smoothly. Aside from normal packaging studies, it should study the proper moves or substitutes for present materials.

The food industry has plenty of supplies and equipment for a normal peace time demand, but its planning for emergency conditions is woefully deficient.

### *Containers—Possible Bottleneck*

TIN is not found in the United States. Therefore, in times such as these, when no one knows how much longer shipments of tin may be free to cross the oceans, users of tin must take stock of the future. This is particularly so for food manufacturers who pack their products in tin cans.

It is true that supplies of tin have been built up and also that this stock will be increased in the immediate future. But tin is an essential war material. Therefore, with supplies restricted, it is likely that food producers will need to turn to other types of containers. This year, of course, is provided for, as sufficient tinplate for the 1940 season has already been made. But plans laid now and experiments carried out this year should assure the development of satisfactory substitute containers for 1941.

Already, many types of food containers in which no tin is used have

## *Hors d'Oeuvres*

• "Save money with fish," says a cook book author. Well, some do—and others take money from them.

• *"Sealed packages of sunshine" is what Wisconsin calls its state-branded eggs. So that's what happened to the sun!*

• Molasses made from Louisiana sugar cane has been found to be one of the richest food sources of iron and the iron is 80 to 97 percent available to the body. So the old sulphur and molasses spring tonic was a diet of iron and brimstone, good for those that felt like hell.

• *Glass Container Association of America recently sponsored the introduction on the air of the song "I'll Bottle Your Love."—In a one-trip single service container or in one good for 30 refills?*

• Branburgers and Spamwiches have been introduced in New York, as if the times weren't confusing enough already. Branburgers are hamburgers in which bran is mixed with the chopped meat. Spamwiches are made by separating two slices of bread with a layer of Hormel's Spam, the canned meat spread whose ancestor was a ham.

• *If you order a cup of "mocha" and the calorie jerker behind the lunch counter looks down his nose at you, here's why: "Mocha" applies only to coffee produced in that district of Southern Arabia known as "Yemen." So don't show your ignorance.*

• That Houdini of the sciences, William A. Gluesing of the G.E. House of Magic, operates an electric motor on power generated by a lemon placed between copper and zinc plates. The citric acid causes a flow of current of one lemonpower.

• *"Electric shock produces an anesthetic effect on fish," says David C. Haskell of the Bureau of Fisheries. This "may be used to quiet them during laboratory procedures and manipulations, such as tagging." Just like der Fuehrer's new weapon.*

• The bees' process for making honey—dehydrating nectar by distributing it throughout the hive and then continually working it while forcing an air current through the hive by fanning the wings—is a good example of efficiency. In fact, it's a honey.

• *Dr. Dafoe says fish is good for babies and that the Quints eat seafood. But what we'd like to know is what Papa Quint ate.*

• The tomato is called "tomayto" not "tomahto," Boston notwithstanding. Such was the decision of members of the ways and means committee of the House of Representatives. So Congress settles another of the world's great problems.

• *The F&DA recently seized 2,450 cases of sardines because the cans were slack-filled. Are no ideals sacred in these troubled times?*

• "This is a Blue Ribbon Country," say the ads of Pabst Brewing Co. We hope—and not entirely for the benefit of Pabst, either—that it remains that way.

F.K.L.

been developed. Glass has long been widely used for food containers and its use can be extended within limitations set by the supply of chemicals for its manufacture and machines for its fabrication. Cans of plain steel or "black iron" sheet can be coated with a suitable lacquer, both inside and out. For some products, separate liners of paper or synthetic sheeting can be used within the can. Aluminum sheet or aluminum laminated on some other metal are also possibilities, although aluminum is in great demand for other purposes. Finally, new types of containers, such as the pickle package recently adopted by Heinz and shown on page 60 of FOOD INDUSTRIES for April, are constantly being made available.

There is obviously no cause for panic in these container prospects. Just as obviously, elementary business prudence demands that the food packer plan ahead what he will do if tin supply is restricted. This year, while tinplate is amply available, is the time to determine by research and experiment the course to follow in 1941, when tinplate may be unobtainable.

### *New Food Law Packs a Bigger Wallop*

IT MUST BE the war that has prevented us from getting around earlier to some rather significant cases reported in *Notices of Judgment Under the (old) Food and Drugs Act.* If management fails to read these notices and fails to interpret the unhappy experiences of other firms in terms of its own self-interest, then let it not be said that it was not forewarned, for the new law is more drastic than the old.

Case No. 30872 socked a food manufacturer just $800, plus, of course, the cost of defending the suit. The court said " . . . the only inspection given to said food prior to shipment thereof in interstate commerce was one similar to the method of inspection which the defendant had been following for a number of years and which method in the year 1935 resulted in the prosecution and in the year 1936 in the conviction of defendant on the charge of shipping in interstate commerce . . . in violation of the act . . . had said food been subjected to the latter (a newer system of inspection—Ed.) inspection, discovery would have been made readily that said food was clearly adulterated within the meaning of said act, in that it consisted in large part of highly decomposed animal substance."

Or take Case No. 30875. "Adulteration of Pickles . . . Plea of guilty. Defendant sentenced to 9 months in the House of Correction. Imposition of sentence suspended and defendant placed on probation for 2 years." "Samples of this article were found to be filthy in that they contained rodent hairs, flies, insect parts, and shells of pupae."

It looks as if these firms should have employed well-trained food technologists and given them proper authority. The new food law packs a bigger wallop and it will be a good investment to avoid trouble by maintaining proper quality control.

**PUBLIC RELATIONS BEGINS AT HOME**

***Isn't the sign on the left going to leave the job seeker in a better frame of mind than the good old-fashioned sign on the right? The neatly lettered, courteous notice is that of a Detroit trailer manufacturer. The crudely lettered, blunt sign is that of a company which probably has the best of intentions but didn't stop to think of the impression created.***

### *When You Take A Civil Service Examination*

IF BY ANY CHANCE you are one of those who are taking civil service examinations for a scientific job, and if you know exactly what sort of a job it is you are after, or where it is located, or under whose direction the job is to be supervised, it is always a helpful move if you communicate first with the persons under whom you wish to work, long before you put in an application for a civil service examination.

In particular, you should use common sense and realize that the man who must choose a candidate from several who may be certified by the commission as having a civil service rating usually has a choice of one from several names. Other things being equal, he is likely to select the person he knows the most about. Hence your correspondence with him or the chief of the laboratory prior to examination should contain details of your industrial or research experience. Put in a complete history. Omit nothing from your history of training, experience or list of accomplishments, whatever it may be.

You do all this before your examination. Afterwards it's usually too late.

### *Get Close to the Grass Roots*

STRANGE things develop with the passage of time. Like the discovery at the New York Agricultural Experiment Station that the addition of pure common salt to canned tomatoes just prior to heat sterilization will accelerate their breakdown and thereby produce a poorer quality than would have been the case without any added salt.

Who started the salting anyway? As near as we can ascertain, it was that much maligned middleman, the canned goods buyer for the wholesale grocer. The canner salted the tomatoes to please his acute taste—not because housewives lacked any salt at home.

And to think that during all these years the canner who salted his tomatoes could have been producing a slightly better quality had the tomatoes been canned plain! Calcium chloride can now be used along with sodium chloride with very beneficial effects. The tomatoes can now be as firm as nature made them, thanks to the researches of Dr. Z. I. Kertesz.

All of which, pertaining to salt, suggests that canners have depended too long on what some one else said that the consumer wanted. It's hard enough to get at what people really want without placing reliance on

others who are not much closer to the grass roots of public opinion than themselves.

In our quaint opinion, the only safe and sure procedure is to go to the consumer for judgment on every matter.

### *Compliments*

READERS of *The Federal Register* will find much gratification in the findings and suggested amendments for definition and standard of identity for canned tomatoes, published on May 21, 1940. The fairness and promptness with which the Department of Agriculture has moved in both the hearings and issuance of the findings of facts is highly commendable. If any other needed amendments can proceed with comparable smoothness, it will do much to offset the belligerent attitude at the first hearings on original definitions and standards of identity.

### *Salt for Heat Cramps*

DURING the summer months, and in places where there is excessive heat, management can do much to improve the comfort and efficiency of workers by providing salt at drinking fountains. It has been amply demonstrated that excessive perspiration depletes the body of both water *and salt*. To drink the necessary water to restore that factor is easy but it is necessary to provide the salt.

When the body is depleted of salt by excessive perspiration, the symptoms are irritability, discomfort, "heat fag" or inabilty to keep going, and abdominal cramps. The amount of salt needed to correct the loss is about one teaspoon per day. This can be drunk as salty water, which is not so pleasant, or it can be taken in pills.

It helps employees' comfort, nerves and efficiency.

### *Flavor—A Blind Spot*

WOULDN'T it be a smart move for food technologists to devote more attention to flavors and the possible ways to make foods taste better? After sitting through dozens of scientific sessions of various organizations during the past year the absence of any real activity in this line of investigation has been very apparent. Only workers in the field of butter manufacture and fluid milk handling seem to be acutely conscious of flavor problems. At the conference on food technology last year, Dr. J. A. Dunn discussed the absorption of foreign flavors by other flavoring ingredients resulting in the customary drabness of commercially baked goods. But at this point memory fails.

One cannot believe otherwise than that the average food technologist is overlooking a very important field of activity. Why leave the vital subject of flavors to the mercy of laymen while pursuing inquires into colloidal systems, volumes, viscosities, textures, colors and the like? Flavor should never be neglected.

### *Thoughts Inspired By Morris Mills Flour*

NO SUBJECT has ever been more talked about in the industry and received less attention in "The Talk of the Industry" than Morris Mills flour. And in the twelve-year existence of FOOD INDUSTRIES we cannot recall a single case that parallels it or even approximates it. For we have been highly complimented from literally scores of sources for not mentioning it. Also, there has been considerable pressure from the other side. Even now we are not passing judgment on this flour, though it is difficult to believe that anyone who really knows milling and baking is not so thoroughly conversant with the product that anything we could add would be superfluous.

Nevertheless, the controversy over the merits of Morris Mills flour has served to focus a tremendous amount of public interest and attention upon the deficiencies of white flour bread from the angle of flavor and vitamin $B_1$ content. This has arisen largely from publicity in consumer publications. Whether this public interest is a fad of only passing interest or whether it is an enduring interest is the big problem facing flour millers and wholesale bakers.

Retail specialty bake shops which can thrive only on a varied succession of specialty items are going in for the new flour. Question is: How long will the public interest last? If the history of specialty items repeats itself, these shops will have to abandon it for other novelties for that succession of novelties is their very reason for existence. On the other hand, if the wholesale bakers want vitamin $B_1$ and wheat germs in their flour, there is not a flour mill in the country that has good technical control but what is ready to supply such flour. Yet the wholesale bakers assert that they will not pay a premium price for such flour unless and until the public itself demands bread that is fortified with vitamin $B_1$ and wheat germ, and shows its demand by willingness to pay the price.

Contrary to the ill-founded beliefs of many a layman, there is no conspiracy in the industry to deprive John Q. Public of his proper nutriment. But bakers and millers, like all food manufacturers, must be able to recover their costs from their sales or else go out of business. For some unaccountable reason humanity seems to think it has a God-given right to obtain its food below cost.

Perhaps the advent of Morris Mills flour will serve as the signal to make the public willing to pay for what is the best form of nourishment instead of what is the cheapest.

### *Are We Overdoing Food "Sanitation"?*

MILTON E. PARKER, production manager of Beatrice Creamery Co., raises some very pertinent questions in his discussion in this issue.

Perhaps you may disagree with him. If so, that is your privilege. As for ourselves, FOOD INDUSTRIES is on his side, and we believe the time has come for dissenting medical men and sanitarians to realize that their own concept of their jobs and functions must change with advancing knowledge.

Inability to master the technic of measuring oxidation-reduction potentials or to comprehend their significance is no justification for arbitrary pursuance of sanitary policies based on earlier scientific knowledge. But read what Mr. Parker has to say.

In particular we commend to all food manufacturers his suggestion for the need of applying qualitative methods to quality control. You've got something there, "Milt."

If anybody wants to debate the subject in these pages, the opportunity is his.

### *No Color Standards*

TENTATIVE standards for grades of quality of CANNED ASPARAGUS and DRIED APPLES have been issued by the Agricultural Marketing Service of the U.S. Department of Agriculture. These are announced elsewhere in the news pages of this issue.

Contrary to our previous practice, FOOD INDUSTRIES is not publishing the text of the standards, nor are we reproducing the colors. Reason: More than 75 per cent of you subscribers indicated that you didn't care whether we reproduced the colors or not. You can get the text in mimeographed form free by writing to A.M.S. But—

If you want the colors themselves, you are referred to "The Dictionary of Color," by Maerz and Paul. Price, $12.

# Technologists Discuss FOOD PROCESSING PROBLEMS

BY ELSIE SINGRUEN
*Cereal chemist, Chicago, Ill.*

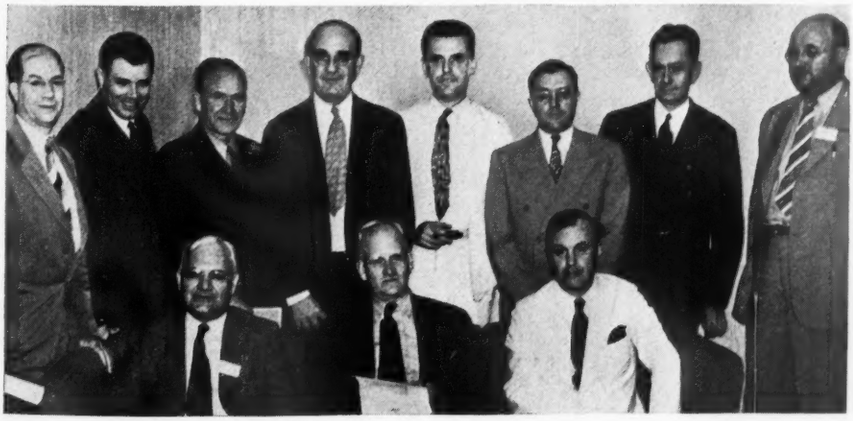
APPROXIMATELY 480 food technologists gathered at the Morrison Hotel in Chicago, June 16-19, for a most successful first annual meeting of the Institute of Food Technologists. The need for such an organization and the great interest of the entire industry in the open discussion of problems common to all its members were clearly demonstrated by this attendance, by the fact that the membership has grown to about 800 during the first year of the Institute's existence and by requests for formation of local groups.

*Father and son register for the meeting. F. W. Tanner, head of the bacteriology department, University of Illinois, Urbana, and F. W. Tanner, Jr., Cornell University, Ithaca, New York.*

Process engineering in food technology was discussed by L. V. Burton, W. L. Badger and G. T. Reich, who made the following important points:

Modern food production necessitates a well-rounded background in chemistry, physics, biology and bacteriology, coupled with a working knowledge of process or chemical engineering. To develop a successful process and to put it into practical and economic operation, it is necessary to be familiar with both the why and the how.

Starting with a thorough understanding of the unit operations and unit processes involved in food production, the process engineer designs the plant to make it a successful commercial entity that will produce what the chemist intended it to produce, and do it all at the right cost.



*Members of the Institute's council get together at start of convention. (Left to right, back row) D. K. Tressler, New York State Agricultural Experiment Station, Geneva; W. L. Campbell, Kroger Grocery & Baking Co., Cincinnati; W. V. Cruess, University of California, Berkeley; F. C. Blanck, H. J. Heinz Co., Pittsburgh; M. E. Parker, Beatrice Creamery Co., Chicago; F. W. Tanner, University of Illinois, Urbana; L. W. Bass, Mellon Institute of Industrial Research, Pittsburgh; E. J. Cameron, National Canners Association, Washington. (Front row) L. V. Burton, Food Industries, New York; S. C. Prescott, Massachusetts Institute of Technology, Cambridge; G. J. Hucker, New York State Agricultural Experiment Station, Geneva. Absent is Roy C. Newton, Swift & Co., Chicago.*

*S. C. Prescott addresses the technologists. He was reelected president of the Institute.*

Every food technologist should know how to recognize a process engineering problem in contrast to a chemical problem. It is equally necessary that plant management provide sufficient research facilities for developing efficient unit operations and processes.

Conversion of batch operations into continuous processing offers a challenge in many food plants. An outstanding example is the successful application of the continuous principle of evaporation and inversion to the manufacture of jelly, which, with certain modifications, may become a feasible procedure in the brewing of beer.

Speakers at the General Food Technology session, of which S. C. Prescott was chairman, were G. W. Putnam, F. A. Lee, J. M. Jackson, W. H. Cathcart, C. A. Shillinglaw and M. W. Brenner.

Highlights of this session were these observations: Sanitary principles have been incorporated in the design of food processing equipment, greatly improving the products. Outstanding developments in the field of dairy equipment include a standardization program for sanitary pipe line and thermometer fittings, the general acceptance of stainless steel, automatic controls, general adaptation of rotary seals to all types of equipment and the development of short time pas-

teurization, plate heat exchangers and so forth.

Chemical and physical methods for the evaluation of optimum quality in raw materials are more and more replacing organoleptic tests. The tenderometer is probably the most valuable means of rapidly grading fresh peas; a texturometer has been developed for evaluation of thawed and blanched corn.

*Assistant Secretary of War Louis Johnson told the technologists what the defense program means to the food industry. His talk was broadcast over a national radio hook-up.*

Heat transfer during thermal processing depends upon viscosity as well as upon the tendency of the liquid to form gels or exhibit anomalous viscosity. In certain vacuum packed products consisting of discrete particles packed under vacuum in the presence of a limited amount of liquid, heat transfer takes place by continuous vaporization, vapor convection and condensation of the water in the container. The rate of heat transfer is affected by the partial pressure of gas in the container, closeness of packing and amount of free water.

Sodium aluminate from aluminum labels interferes with the usual determination of causticity, producing results too low by an amount at least equivalent to the amount of sodium aluminate in the washing solution. Some titration methods give values too high. The use of proper indicators in a modified method produces accurate results.

Vitamin $B_1$ levels were established for various stages of the malting and brewing process and for different types of finished beers. The malting procedure apparently does not affect the vitamin content to any significant degree, there being 180 to 200 I.U. in barley and 160 to 210 I.U. in malt. Beer worts contain 25 to 30 I.U., depending upon the concentration of the wort and the percentage of malt. During fermentation this vitamin content was greatly reduced, so that the storage beers contain 1 to 5 I.U. of $B_1$ per 100 milliliters.

Facts on the effect of processing on the vitamin content of food were presented by C. A. Elvehjem, C. R. Fellers, B. E. Proctor, C. G. King, K. G. Weckel and P. F. Sharp. G. C. Supplee was chairman of this vitamin session.

More research is necessary on the vitamin content of natural foods, on vitamin losses during preparation and on the preservation of vitamins. Variety and fertilizers affect the natural vitamin content of foods. Losses occur most frequently during handling by long contact with air. It is important that fruits and vegetables be processed for canning and freezing immediately after harvesting. Not only are the vitamins specific in behavior, but this behavior varies with different fruits and vegetables. In general, common food processing methods, if properly conducted, are capable of reducing vitamin losses to a minimum. Oxidation is probably the most important single factor to be avoided. Heat, oxygen and the presence of metals, especially copper, aggravate vitamin losses due to oxidation. Losses in vitamin C are usually associated with changes in flavor and color. Respiratory enzymes when left unchecked during storage also reduce the vitamin content.

"Technology of Food Preservation" and "Microbiology in Food Processes" constituted the topics of two symposiums concerned with the prevention of spoilage due to chemical or microbial deterioration. Presiding

*Three prominent food technologists. (Left to right) M. E. Parker, Beatrice Creamery Co., Chicago, retiring councilor of the Institute; B. E. Proctor, Massachusetts Institute of Technology, Cambridge, new councilor; and G. A. Fitzgerald, General Foods Corp., New York, also a new councilor.*



*Weighty problems were discussed at the smoker. (Left to right) A. A. Schaal, Lever Bros. Co., Cambridge, Mass.; Walter H. Eddy, Teachers College, Columbia University, New York; and L. V. Burton, Food Industries, New York.*

over the former session was D. K. Tressler. The speakers were H. L. A. Tarr, H. A. Schuette, Frederick W. Miller, Jr., W. V. Cruess, F. W. Fabian and E. W. Harvey. The latter session was presided over by B. E. Proctor; the speakers included B. W. Hammer, G. F. Garnatz, F. M. Clark, O. B. Williams, H. B. Richie and W. L. Mallmann.

Methods of analysis and control of unit operations were discussed from the viewpoint of different food industries in a session headed by R. C. Newton and participated in by H. E. Robinson, A. D. Rich, G. V. Hallman, Louis Ehrenfeld, R. W. Mitchell and Charles N. Frey. This session demonstrated the similarity of products and processing control as a function of the plant control laboratory and its importance for uninterrupted operation. Especially in the milling industry, results found in the research have reflected themselves in significant improvements of the raw materials.

Louis Johnson, Assistant Secretary of War, in a talk broadcast over a national radio hook-up, emphasized the importance and necessity of preparedness of the food industries for the safeguarding of health in times of national emergencies. A balanced diet for our armed forces must provide suitable food products, capable of being transported in the least possible space, resistant to temperatures encountered under all climates of the Western Hemisphere. The development of dehydrated foods, boneless meats, suitable wrapping and packaging materials and food and food accessory tablets to counteract fatigue offer a challenge to the food industries. Tin supplies are giving the government cause for concern.

In the session on "Packaging of Foods," E. S. Stateler presided; participating were Arthur B. Erekson, H. J. Reynolds, William Rabak, Charles L. Smith, Carl S. Pederson, Evan Wheaton and G. J. Brabender. Packaging was defined as a unit operation necessary to maintain and protect quality and flavor. Common enemies to the stability of many foods are heat, oxygen, enzymes natural to fruits and vegetables and meats, light, metals and microorganisms.

External corrosion of tin cans is chiefly due to improper atmospheric conditions during storage, contact with alkalis, acids and neutral salts, especially chlorides and sulphates, and to certain special causes, such as sugar or salt concentration on the outside of the can or leakage. Prevention of spillage, rinsing in inert water, or addition of sodium chromate or sodium silicate to cooling or rinsing water, reduction of cooling time, reduction of chlorine in tap water to 1 to 2 p.p.m., removal of air from steam and the application of aluminum liners for crate bottoms are recommended.

New packaging materials are being developed continuously. Their proper selection for specific purposes is of great importance. Coated type board is superior to impregnated carton stock. Wax treated papers are generally efficient if the wrapping procedure takes into consideration that sharp folds tend to impair the moisture-vapor-proof qualities of the package. Moisture-proof viscose sheets are reliable at all temperatures, and are not affected by creasing. Laminated rubber compound sheets stand rough treatment. It is essential in all packaging operations that the seal is as efficient as the wrapper itself.

S. C. Prescott was re-elected president of the Institute. The other officers named are: Vice-president, R. C. Newton; secretary-treasurer, G. J. Hucker.

*1. Local arrangements committee holds a last-minute session. (Left to right) H. S. Mitchell, chief chemist, Swift & Co., Chicago; G. V. Hallman, bacteriologist, Continental Can Co. research laboratories, Chicago; E. H. Harvey, chairman of the committee; M. L. Laing, chief chemist, Armor & Co., Chicago; A. F. Frantz, Merck & Co., Chicago; E. S. Stateler, Food Industries, Chicago.*

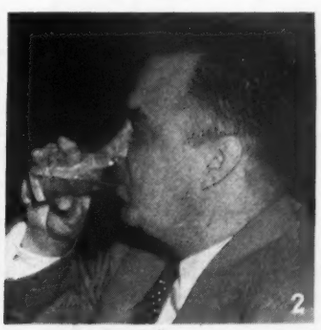
*2. Gene Flack, Loose-Wiles Biscuit Co., at the smoker.*

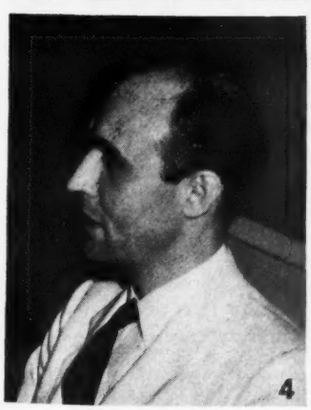
*3. George F. Stewart, of the poultry research department at Iowa State College, Ames, Ia.*

*4. John M. Sharf, of American Bottlers of Carbonated Beverages, Washington.*

*5. W. D. Tiedeman, State Department of Health, Albany, N. Y.*

*6. Elsie Singruen, cereal chemist, Chicago, and R. H. MacDonnell, chief chemist, Great Atlantic & Pacific Tea Co., New York.*





# So All Your Troubles Are DISTRIBUTION PROBLEMS?

***Managers who fight competition only through the sales department forget to punch with their left. A knockout blow might be delivered by the production department.***

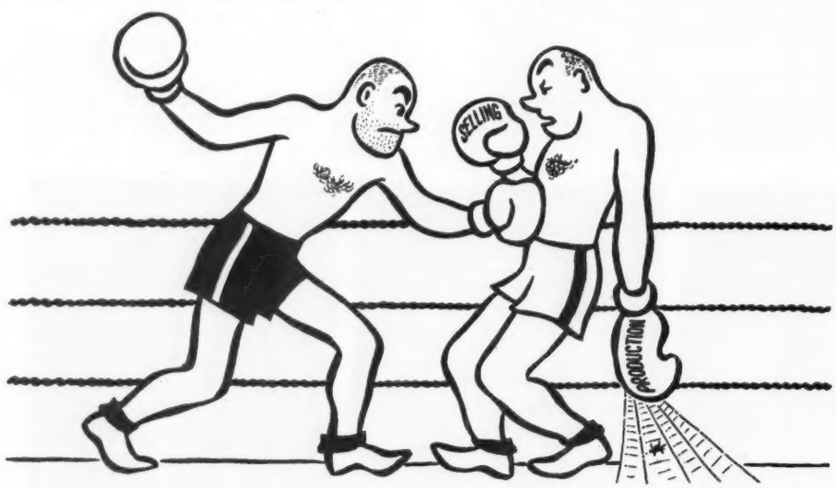
By L. V. BURTON
*Editor,* FOOD INDUSTRIES

EVERY little while some one makes the statement that all the production problems of food manufacturing are solved, that the only problems remaining are the problems of distribution and selling. Which is just about as lopsided an opinion as has ever been expressed.

Such a statement is never voiced by men who are thoroughly trained and qualified for the function of management of a food manufacturing business. The complaint invariably comes from men who seem to be lacking in the breadth of training and experience necessary, for such a job as general manager. Usually these men have come up through the sales route, and they possess an exaggerated idea of the importance of the selling and distribution function of a business.

No one will deny the vital importance of selling *at a profit*. Yet if the man who is satisfied that no production problems remain were to think it through, he would realize that the production function is every bit as important as the selling function. He is like the fighter who forgets to use his left jab.

If you are one who believes that only selling problems remain in the food business, try to imagine what it would mean to your sales volume or profits if your production department were to announce a new production cost that is 5 percent below yesterday's cost, or 20 percent, or 50 percent. It's dollars to doughnuts that a 5 percent cost reduction would mean improved profits, while a 10 or 20 percent cost reduction would mean a cut in selling price, a great increase in volume and a considerable increase in profits. Why? Simply because manufacturing costs are a factor in distribution problems. In competition, if you have a lower price than the other fellow, it is easier to get the business provided the necessary quality is there. Sales departments do not put the quality into the goods, nor do they invest the money that appears as manufacturing costs. All that the sales department can do, and usually does, is boast about quality to the customer and raise hell about it at the plant, or insist on lowered selling prices.




***Managers who neglect to use the production department effectively in meeting competition are like fighters who forget to punch with the left.***

General management's most important function is to integrate the activities of the sales and production departments—make them a team, pulling together—and steer them. Every one with manufacturing experience has heard these old complaints: "If we had a good sales department we could sell the goods;" or "If we had a good production department we could get better prices and go to town."

Right here is where general management, if it is smart, will do some heavy thinking, for when one department is highly critical of the ability of the other, *particularly when each is critical of the ability of the other,* then it's up to general management to diagnose the cause and find the remedy. Mutual hostility is a very important symptom.

If the "G.M." lacks any real appreciation of the problems of running a factory and thinks that the selling and distribution problem is the only one deserving of his attention, he may easily overlook the fact that the correct answer to a selling problem may come from the factory.

To say that all production problems have been solved is not true even in a qualitative sense; and in a quantitative sense the problems of production will always be with us as long as there is competition. By qualitative sense is meant the problem of *how* to produce a certain line of satisfactory goods without reference to costs. By quantitative sense is meant the problem of producing at a cost that is

satisfactory under a given sales volume.

If general management assents (as it sometimes does) to local price concessions that are not based on profit-making sales at the lower price, then the beginning of the end is in sight. On the other hand, if the management permits (as, alas, it sometimes does) the robbing of formulas of their proper quality, the consumer reaction is bound to be bad and sales volume will surely drop. And the end is disaster. In either case, recrimination develops, and the hostility of sales and production departments to each other becomes something fearful to behold. Cases are known where the fault was entirely that of the management, where salesmen were in total ignorance of the reduction in quality, or where production men were in ignorance of a vacillating price policy. Wherever such conditions arise, the ensuing contempt of various departments for each other may be needless, and certainly it is bad for the business as a whole.

No one in his right senses ever believes for one minute that *all* business problems can be classified as either distribution and selling problems or as production problems. For there can be many other important problems, such as insufficient working capital, too much overhead, impossible capital structure, salaries too high and too many of them, rents too high and many others, including downright crookedness and rascality.

Eliminate all these other problems of business and consider only production and selling. If anyone ever says that only selling problems exist—that there are no production problems—put him down as a very illogical thinker. True, he may temporarily occupy a position of authority—even of importance. But it is not likely that he will remain there indefinitely solely because of his own ability. External circumstances may arise that increase the demand or prices for the goods his business produces, and thereby make him appear to be a success.

***Too many managers have a distorted view of the relative importance of the sales and production departments.***

Experience tells us that there are no tricks of selling and distribution that will compensate for production costs that are too high. Experience only tells us that there are mistakes and pitfalls of selling and distribution to be avoided. Another lesson of experience is that, in competition, the higher the price of goods to be sold the harder it is to sell at a profit and the greater the cost of selling. On the other hand, the lower the relative price in competition, the easier it is to sell and the lower the cost of selling; also, the less the problems of distribution from the manufacturer's viewpoint.

Yet it would be folly to think that other manufacturers would be unable to duplicate cost reductions and legitimate price cuts that compel competition to duplicate the cost reductions. As one successful food manufacturer in the low price field has put it:

"I like to keep our production costs just a little below the average in our line. I don't believe in being the lowest cost producer because, with our huge volume, the temptation to reduce prices might be too great to withstand. And if we cut the prices we would surely force others to find ways to cut theirs, which could easily put us back relatively where we were or even leave us as high cost producers. As long as we can produce at a cost a little below the average we will be able to sell at a reasonable profit.

"On the other hand, if our production costs are too high, and profitable prices over these costs create difficult selling problems, then I look to our production department for the answer. Sales promotion cannot force people to buy at uncompetitive prices. Sales promotion and advertising merely help enlarge the volume when the goods are available at the right competitive prices."

At the present time food manufacturers must adopt the broader viewpoint toward production departments. How to produce, regardless of cost, has not been a problem for a long time. But how to produce at the right cost—the quantitative view—is a real problem. And always will be.

Let us hear no more complaints about the problems of distribution and selling as something remote from the rest of the business. For such artificial abstractions are just about as important as a debate about which leg of a ladder is the most important.

Those who take a one sided view of the problems of business do not inspire a belief in their qualifications for success as general managers.

***Management makes a mistake when it devotes all its attention to sales problems and considers production problems as a closed book.***

# What is Satisfactory Bacteriological Quality In Foods?

*Flavor is too often sacrificed for an unnecessarily low bacteria count*

By
**M. E. PARKER**
*Manager of Production,*
*Beatrice Creamery Co., Chicago, Ill.*

***Precaution against overlooking small or deeply imbedded colonies is taken by use of scored plates, a lighted background for the plate and a magnifying glass for the operator.***

QUALITY determination in foods by bacteriological methods is based on bacterial enumeration; commonly known as the "plate count."

The method has evolved with the public health movement to emphasize sanitation, to combat infection and disease, and to increase the human life span. Thus sanitation has become a symbol of purity measurable by the absence, or by the presence, of micro-organisms held to be associated with unsanitary conditions.

As a result, food quality from a public health standpoint is held to be closely related to bacterial purity. So close is the relationship that today the standard plate count, and possibly the number of coli-form bacteria present, appear to occupy the center of the stage in the certification of the sanitary quality of milk and other food products.

While we have come to accept certain numerical values as indicative of a proper sanitary quality, there is good reason to wonder if too much emphasis is being placed on the quantitative significance of these bacterial counts—particularly in respect to heat-processed products. No one will deny that a "ceiling" for the total bacterial count in raw milk has practical value. Establishing a "floor" for low counts in raw or pasteurized milk does not, however, appear feasible. Apparently not enough attention is being directed to qualitative methods centering upon the identification of the general type of microorganisms responsible for quality defects.

An example of the false security possible in low bacterial counts is the widespread occurrence during recent years of "cappy" or oxidized flavors in Grade A milk, both raw and pasteurized. In most instances the sanitary quality of these milks, as judged by bacteriological standards, was excellent. But consumers were discouraged from using the milk because of its taste.

Many dairymen, trying to overcome the handicap of oxidized flavors—characteristic of low-count milk—resorted to the practice of inoculating such milk with small quantities of a lactic bacterial culture. This caused an increase in the number of bacteria present, but was not readily detectable by the former standard method of making plate counts. Yet consumer acceptance of the milk was increased.

However, with the new standard method of plating, using tryptone-glucose-beef extract-milk agar with 32 deg. C. incubation temperature, milk with added lactic bacterial culture would be declared of inferior quality bacteriologically because of its increased bacterial count, in spite of its improved consumer acceptability.

These confusing results apply not only to Grade A milks. Recent experiences where market milk regulations with respect to low bacterial counts are enforced show such milk supplies unsatisfactory for making cheese of good quality. Flavor impairment of this nature is said to occur in the production of Swiss-type cheese in Ohio, Wisconsin and Minnesota. Consequently, it begins to look as though methods of evaluating quality need revision. A broader viewpoint, one that includes something in addition to just the number of bacteria present per cubic centimeter, should be considered.

Practical milk production without the introduction of various types of bacteria in all sorts of conceivable ratios is impossible. It is probable that bacteria characteristic of the cow's udder, of the soil and of other sources are represented in any sample of milk produced.

A further complication is that optimum conditions for propagation of these various bacteria are influenced by a great many factors. Therefore the problem of controlling the quality of the milk supply by cultural methods involves a decision as to the significant types of bacteria that are to be detected, before the method for determining the bacteria present can be properly selected. Broadly speaking, milk control agencies appear to be interested in the bacteria that reflect conditions of production or, more specifically, give evidence of any extraneous matter that may have gotten into the milk. There is also interest in the extent to which some bacteria may have multiplied in the milk, which testifies to the method of its subsequent handling.

THE former standard method for plating milk used a nutrient medium containing no added sugar and therefore did not favor growth of acid-forming bacteria such as *S. lactis.* Exclusion of the chief spoilage bacteria made easier the finding of those bacteria originally introduced from varied sources and having little to do with milk spoilage. Apparently the new method has been adopted with the idea that determination of the largest possible proportion of the bacteria present in any milk sample is desirable. Consequently the nutrient medium contains glucose, the sugar available to the greatest number of kinds of bacteria, and also milk with its sugar, lactose.

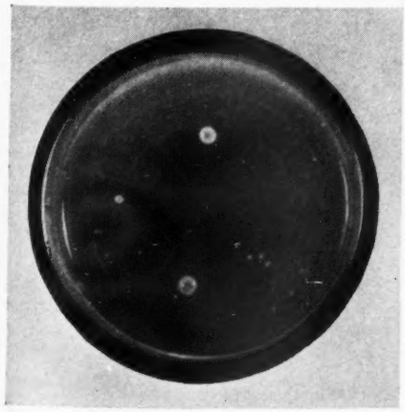
Abele and Damon,[1] who examined 1,000 samples of milk, found 21 percent more bacteria by the new method than by the old; 70 percent of the samples showed a higher bacteria count. The same investigators have also shown that, of 382 samples of raw milk showing a colony count below the 50,000 per cubic centimeter standard of the U.S. Public Health Standard Ordinance, only 7.5 percent would have exceeded this figure, while 2.5 percent would have exceeded the 200,000 standard for raw milk. Accordingly, it was concluded that use of the new medium will not necessitate changes in numerical standards.

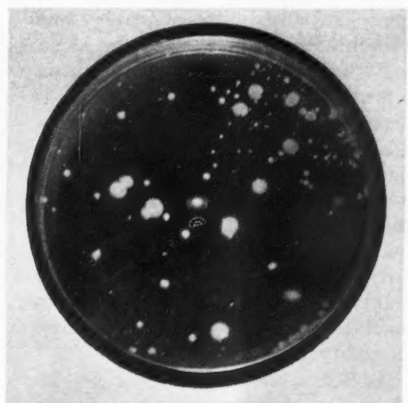
### *Municipal Regulations vs. Good Flavor*

In Boston, the Board of Health[2] has not only adopted the new medium and the 32 deg. C. incubation temperature, but has also established a standard of 5,000 calories per cubic centimeter for Grade A pasteurized milk and 20,000 for Grade B. The deduction seems to be that, since the new medium is especially favorable to *S. lactis,* it is of definitely greater administrative value when applied to raw milks and will detect improper cooling on the farm, in transit, or in both locations. The value of innocuous amounts of *S. lactis* in inhibiting oxidized or cappy flavors is thus to be ignored and the dubious practice of encouraging the not so obvious insanitary practices is to be substituted. Then, too, I believe the Chicago Board of Health has had the experience of greater difficulty with increased bacterial counts in spring and fall months, when the change in seasons is not properly anticipated. By the same token, refrigeration on the farm has sometimes resulted in lower plate counts even in the face of relaxed vigilance to details of sanitation.

THERE is little doubt that the new method will result in the delivery of milk of lower bacterial content, whatever may be the numerical standard. It is not certain, however, that the milk will necessarily be intrinsically better. Already there is considerable complaint regarding the high price of market milk in many localities, with the result that canned milk is being substituted for the fresh products. Incidentally, the canned product has not been subjected to such rigid inspection. Possibly there may be good reasons not to attempt this.

Furthermore, in the market milk field, new methods are being developed to avoid cappy flavors. These involve additional equipment, special processing and, of course, added expense; all because the bacterial count is too low in the raw milk as well as in the pasteurized product. Also, in the inspection of dairy plants especially with respect to replacements, there has been a definite inclination to seek and demand special designs and "tailored" equipment, which adds





***Dilutions of samples which give 30 to 300 colonies on a plate provide best conditions for growth of organisms as well as for most accurate counting.***

**Table I—Plate Counts Obtained in Two Dilutions**

| Sample No. | 1:100 plate | 1:1000 plate | Ratio | Reported count | Correct count |
|---|---|---|---|---|---|
| 1 | 292 | 115 | 3.94 | 115,000 | 72,000? |
| 2 | 140 | 36 | 2.57 | 14,000 | 25,000? |
| 3 | 328 | 3 | 10.93 | 32,800 | 33,000? |
| 4 | 708 | 23 | 3.78 | 23,000 | 23,000? |
| 5 | 389 | 85 | 2.18 | 38,900 | 85,000 |
| 6 | 22 | 30 | 13.63 | 2,200 | 30,000 |
| 7 | 19 | 12 | 7.90 | 1,900 | ? |

to the cost. For this the consumer must eventually pay if he insists upon fresh milk.

To bear out these last statements, consider the opinion of Dr. E. G. Hastings[3] of the University of Wisconsin:

"The cost of producing milk depends, in part, upon the complexity of the regulations imposed. If these are such as to force the producer to deliver a milk that has better keeping qualities than the average consumer demands, the interests of the consumer will have been sacrificed, because he will be forced to pay more for the milk he uses than would be necessary if a product having slightly poorer keeping qualities had been supplied him. It seems to me, therefore, questionable whether the change from the previous medium to the present one will prove an unmixed blessing to all interested in the fluid milk industry."

DISREGARDING for the moment the need for qualitative methods, let us analyze some of the reasons why the mere enumeration of bacteria by a cultural method is in itself open to criticism. C. A. Abele, a member of the Standard Methods Committee of the American Public Health Association, formerly referee for the examination of milk and milk products for that committee, has said that "care in the conduct of milk plating procedure, and in the computation of the plate count . . . is something which is much rarer than many of you suspect." To proceed with Mr. Abele's reason for pointing out the prevailing inaccuracies which are apparently not uncommon, I shall quote from his discussion of my paper on this subject which was presented at the 28th annual convention of the International Association of Milk Sanitarians:

"During the past eighteen months, I have been in position to review the plate count reports of a number of laboratories, and the computations by which these counts were arrived at.

"Permit me to present in Table I some examples of how counts were arrived at.

"When viewing columns 2 and 3, picture two ciphers after each figure in the former, and three ciphers after each figure in the latter. Then compare them again and note the discrepancies. The purpose of two dilutions is two-fold: (1) to provide that dilution which will result in the most readily countable number (between 30 and 300) of organisms in the portion plated, and which will have optimum conditions for growth, and (2) to provide a check on the number of organisms developing in either plate. In a perfect plating of two dilutions, such as 1:100 and 1:1000, the colony count on the former should exactly coincide. This yields a ratio of 1 to 1. I take the position—and we have followed this policy in the Alabama laboratories for years—that a permissible ratio of 2 to 1 makes ample allowance for unavoidable inherent variables in the plate count procedure; and that a ratio greater than 2 to 1 indicates a serious error somewhere in the procedure or in the counting. Note, now, the ratios between the two colony counts of all the examples listed. Which of these seven plate counts are correct, the count derived from the 1:100 plate, from the 1:1000 plate, or the average, or none? If you were the milk producer you would take one view; if you were the milk purchaser, buying on a plate-count premium basis, you would take another view. But, as a scientific, conscientious milk quality control official, which do you consider the correct count?

"Study all these examples. It probably makes slight difference in the conception of the quality of a given milk supply whether the count is reported as 14,000, 25,000 or 36,000 as indicated in the case of sample No. 2. But it is significant that the ratio between the colony counts of the two plates was 2.57 to 1, which implies that one, or the other, or both of these counts is or are wrong.

"Is it surprising that Mr. Parker can find no correlation between plate counts and real milk quality?

"The conviction is growing upon me that laboratory directors, teachers of bacteriology and milk laboratory technicians, as well, have their gaze fixed so firmly upon the newer diagnostic technics that they are slighting the more prosaic technic of making milk plate counts. It is rarely—or may be never—that a life depends upon an accurate milk count, as may be the case in the correct diagnosis of a diphtheria culture or blood smear. But consider the millions of dollars in milk checks which are diverted into or out of the pockets of milk producers and the milk supplies erroneously approved or condemned by health officers, because of carelessly plated milk samples or inaccurately computed or determined plate counts.

"I am not prepared to propose the abandonment of the plate count, and the substitution of one or more other tests, since other tests also have their failings. But I do charge that in too many cases the plate counts reported are so inaccurate as to be misleading, and that, if the plate counts were more carefully and painstakingly arrived at, and results which do not check were discarded, much of the criticism now leveled at the plate count as an index of milk quality would be withdrawn."

We regret that we must take exception to Mr. Abele's statement that "it probably makes slight difference in the conception of the quality of a given milk supply whether the count is reported as 14,000 or 25,000 or 36,000." While that may be true from the strictly laboratory point of view, it is a matter of considerable importance to a milk distributor whose milk has been analyzed by a municipal or county laboratory and the results published for all to see and interpret as best they can. This is no mere supposition on our part; there are several localities where milk is classified by its bacterial count and with a standard plate count of 25,000 to 35,000 as the dividing line between what is considered as the best grade and the other grades. Thus, if a count in excess of the standard is reported for milk that actually is entitled to a plate count of half or less than half the standard, then a grave injustice is being done, especially if the dairy involved is actually providing quality merchandise by all other standards.

ACCORDINGLY, the prevailing inaccuracies of the standard plate count, even when reduced to "a permissible ratio of 2 to 1 for making ample allowance for unavoidable inherent variables in the plate count procedure," as suggested by Mr. Abele, would seem to be a serious indictment of the method. If cultural methods of bacterial enumeration do not permit of better agreement than a 2 to 1 ratio —and we suspect the average ratio is even higher from Mr. Abele's data— why in the name of common fairness should bacteriologists persist in quantitative methods when admittedly the results obtained have little if any qualitative value in the critical zones of quality determination?

In fact, while some authorities are advocating the measurement of quality in pasteurized milk supplies by means of the phosphatase test and the presence of *B. coli*, other methods do seem worth considering. No one test can give us all the information we desire. The coli-form index advocated by Levowitz[4] is definitely worthy of careful study and consideration. Johns[6] also has suggested greater utility of the methylene blue and resazurin tests than has apparently been recognized; not to ignore direct microscopic examination.

For rapid detection of the poorest milks, the resazurin and methylene blue tests appear to have distinct advantages. They fail, however, to indicate the source of the trouble, and here the direct microscopic examination is unexcelled. For the routine grading of a series of samples, the modified methylene blue test has the advantages of cheapness, reliability and simplicity. (Preliminary tests indicate that it may furnish as useful information as the standard plate count in the examination of pasteurized milks). Both the resazurin and methylene blue tests are sensitive to the state of activity of the organisms, a feature not possessed by the counting methods. For that reason they give a more accurate indication of the true bacteriological condition of the milk.

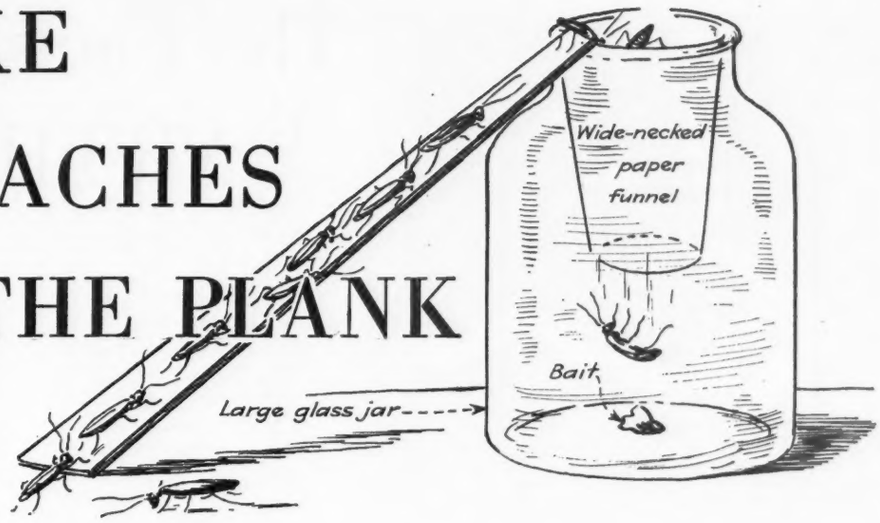
In connection with the sanitary features of the quality control of dairy products, modifications of the Burri smear culture technic are proving of value in application to butter and ice cream. There are reported instances where the Burri smear technic has isolated the foci of infection where plate methods would never have brought it under suspicion. One of the most appealing features of this method is that it can be applied to a variety of causative factors of quality defects by suitable variations in the cultural methods.

Other dairy products have had their quality improved by qualitative bacteriological methods. Many of the cheesy surface taints in creamery butter during recent years have been traced to infection from chlorinated water supplies which were safe from a public health standpoint.

We are inclined to agree with the view that the plate count should not be abandoned in favor of other tests which also have serious failings. However, we do believe that if the new standard medium were used, as it can be used, to differentiate between general types, more valuable information regarding the quality of foods so tested would result. On the other hand, to place the emphasis on low counts—even on any count, alone —is to defeat our purpose, already

*(Turn to page 80)*

# MAKE COCKROACHES WALK THE PLANK

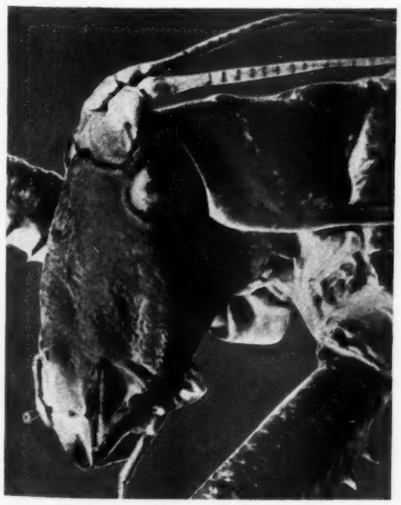



By **ERIC HARDY**
*Liverpool, England.*

INTERNATIONAL pest of the food industry, the cockroach can be checked by trapping without expensive fumigation or dangerous chemicals. Food contamination is therefore reduced to a minimum.

The American cockroach, *Periplaneta americana;* the cosmopolitan *Blatta orientalis,* smaller in size; the German "shiner," "croton-bug" or "steam-bug" cockroach, *Blatella germanica,* whose flattened body enables it to get through cracks and crevices; and the Australian cockroach, *Periplaneta australasiae,* known by the yellow border to its thorax, all occur in North America and are mostly of oriental origin, transported by commerce.

The most effective simple trap that will take any of these consists of little more than a bottle or jar baited with special food. In one food warehouse, twelve of these traps, baited with banana peel, bread, meat or vegetables, plus a little beer or aniseed, between July 16 and Oct. 7 captured 8,430 cockroaches, but required no more labor than the ordinary night watchman.



***Head view of the cockroach, a close relative of the locust.***

Get a large 2-lb. wide-necked glass jam jar or milk jar and fix a cardboard cap with a hole in the center large enough to take comfortably the body of a cockroach. In fact, as large an entrance as possible is desired. From this there should lead down a short funnel, tapering slightly, and ending at least 4 in. from the bottom of the jar, but with its end open wide enough to allow a cockroach to pass through with ease. That's the trap.

Now bait it with some attractive food not likely to be found loose in the vicinity. Whatever you use—bread, banana peel (a very good bait) or food refuse—make it extra attractive with some odorous lure like beer or aniseed dropped on the food. And finally, lean a small piece of wood or cardboard from the floor to the top of the jar so that the cockroaches can climb up it. Place the trap near the food stores at night. The strong odor of the beer or aniseed will attract the insects and they will climb up the gangway and enter by the cone, which is of stiff, slippery paper a couple of inches long so that they soon slip down into the jar. They are then unable to climb up the glass sides of the jar and escape. The bottle traps are collected in the morning, the cardboard disks removed and the cockroaches tipped out into boiling water for their destruction. Otherwise they are useful for feeding tree frogs and pet toads at the local zoo.

Such traps, of course, are advised for systematic regular use in order to keep the cockroach population at a minimum. In the event of buildings being overrun with severe "epidemics" which require rapid reduction, fumigation and poisoning may be tried out. Nevertheless, if sufficient traps can be used they should prove equally effective and cheaper.

The best and safest fumigant is sulphur dioxide, made by burning sulphur, 2 lb. per thousand cubic feet. Carbon disulphide may be used in smaller places that can be kept closed for 36 hours. This is, however, dangerous as a fire hazard, for $CS_2$ can ignite from a steam pipe. The best anti-cockroach powder for laying in their haunts so that it will clog their breathing pores and kill them is three parts sodium fluoride mixed with one part pyrethrum. But sodium fluoride is often prohibited by municipal health authorities. Borax and pyrethrum sweetened with chocolate, or plaster of paris with twice its volume of sugar, are also successful. Phosphorous paste and red lead will be eaten with fatal effects. Sprays to fetch the insects out of their hiding places can be made by placing half a pound of pyrethrum powder in a gallon of paraffin oil for two hours, then decanting and adding methyl salicylate. All these methods, it should be noted, are the results of special experiments in cockroach control under factory and domestic conditions.

In addition to using these baits, all cracks and crevices should as far as possible be plastered up.

### *More on Pest Control*

Other important articles on insect control which have appeared in FOOD INDUSTRIES are here listed:

Insect Control in Dried Fruits, *F.I.*, **3**, 117, 1931.
Systematic Housekeeping, *F.I.* **6**, 66, 1934.
Combat Your Plant Pests, *F.I.* **6**, 113, 1934.
Controlling Cockroaches, *F.I.* **6**, 216, 1934.
Storage Beetles, *F.I.* **6**, 258, 316, 1934.
Flies! Gnats! Ants!!! *F.I.* **6**, 460, 1934.

# The Facts About "ARTIFICIALLY"

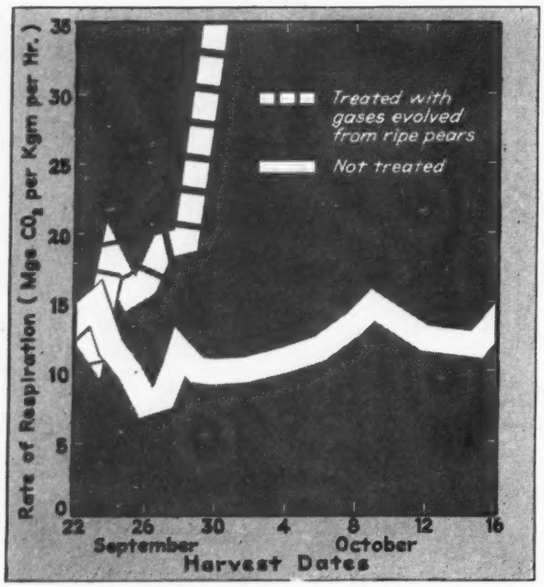



***Fig. 1—Effect of gases evolved by ripe pears upon the respiration of Comice pears treated immediately after picking. (From: Hansen, Elmer and Henry Hartman,* Plant Physiology, 12, 445, 1937.)**

## Part I

ETHYLENE in itself does not ripen fruit, but it does stimulate the natural processes associated with ripening. It does not add the color to oranges, but it hastens the destruction of the green coloring matter, chlorophyll, that masks the natural color of the orange. Tomatoes treated with ethylene likewise have the red pigment unmasked by the hastened destruction of chlorophyll. And the starch conversion to sugar is accelerated in the banana by the indirect effect of ethylene in hastening the general metabolism of the tissue.

Ethylene is a natural product of the metabolism of most plant tissue and it is naturally present in considerable quantity during the ripening of almost all fruits. Vapors from ripening fruit, if drawn over green fruit, will cause a decided increase in the rate of ripening of the green fruit. Correlated with the rate of ripening is usually an increase in the rate of respiration of the fruit.

A graph is presented in Fig. 1 to show the effect of gases evolved from ripe pears upon the respiration of unripe pears, and from this we see that byproducts of metabolism are indeed effective. These gases can be purified by the best known chemical methods, absorbing out all known constituents except ethylene and this effect is still observed. If an ethylene absorbing chemical is placed in the gas conducting tube between the ripe and unripe fruit, the rate of respiration of the unripe is not altered by the treatment. In the final step, ethylene has been actually identified, by chemical methods, as a constituent of the gases produced by ripening fruits.

The fruits do not have to be of the same kind to produce an effect upon the ripening of one another. Emanations from apples and oranges will accelerate the ripening of bananas. Findings such as these are stimulating research into the storage of mixed fruits and vegetables in order to eliminate too rapid ripening, and hence decay, of produce intended for long storage.

The production or presence of ethylene can be qualitatively and almost quantitatively determined by the epinastic, i.e., downward, bending of tomato petioles as is shown in Fig. 2. This downward curvature results from the ethylene effecting a more rapid growth of the cells along the top than along the bottom of the leaf stalk, and the resulting bending is commonly referred to by plant physiologists as epinasty. Not only is it possible by this procedure to demonstrate the production of ethylene from ripening fruit, but it is also possible to show that the emanations from flowers, shoots, stems and so forth contain sufficient ethylene to cause this epinastic response with test plants when the two are confined in a limited atmosphere by a bell jar or some similar apparatus.

Since ethylene is produced by plant tissue, it is incorrect to refer to the coloration of citrus fruits and tomatoes and the ripening of bananas, pears, persimmon and so forth by ethylene as a method of artificial coloration and ripening. But instead it should be referred to as a method of *"natural ripening"* of fruits and vegetables. As far as it can be determined by research workers throughout the world, the ethylene treatment brings about the physical and chemical changes in the tissue in a normal manner. The only difference is that these changes take place in treated fruit at an accelerated rate, and the tissue arrives at the stage we know as ripe at an earlier date than if it had not been exposed to any more ethylene than it could produce in itself.

Care must be taken to distinguish this natural coloration as a part of the ripening process from strictly artificial coloration, also commonly and erroneously referred to as "artificial ripening." The use of chemical dyes and bleaching agents to enhance the color of fruits is to be classed as an artificial method and should never be confused with the addition of ethylene, a pure constituent of the byproducts of plant metabolism.

### *Ripening by Kerosene Car Heaters*

At the turn of this century, shipments of mixed colored citrus fruits into Northern markets were prevented from freezing by heating the railroad cars with kerosene stoves. Where this was done, the fruit took on the characteristic color; and, of course, it was in greater demand by the consumer. In order to meet this demand in a better way, the growers started heating the storage rooms. They soon realized, with accompanying monetary loss, that only the heat provided by kerosene stoves was effective, and the benefit derived was in proportion to the amount of a tear-compelling type of combustion product that could be obtained by the proper manipulation of the burning of the stove.

Sievers and True in 1912 studied the ripening of citrus fruit by the heat method, and they concluded that the kerosene stoves were the best and that the effect was apparently due to incomplete combustion. They also reported that the exhaust of a gasoline motor would also cause a rapid coloration of the fruit.

By

**NORWOOD C. THORNTON**

***Boyce Thompson Institute for Plant Research, Inc. Yonkers, N. Y.***

# RIPENED FRUIT

It was not until 1923 that the causal factor of the kerosene stove was discovered, when F. E. Denny in the U. S. Department of Agriculture laboratory in California determined that it was ethylene that was being produced in the incomplete combustion of kerosene. He showed that when a small amount of pure ethylene was released in the citrus fruit storage room the fruit colored very rapidly. This new method eliminated the necessity for long periods of heating, which resulted in drying of the fruit, and the possibility of the acrid fumes of the stoves causing injury to the fruit. This new method of coloring citrus fruits was protected from exploitation by means of a public service patent.

Commercial utilization of ethylene for hastening the ripening processes of many agricultural products was instantly investigated by research workers in all parts of the world. Notably among the early workers may be mentioned Chace and Denny, 1924 (citrus fruits); Rosa, 1925 (tomatoes); Harvey, 1925-28 (celery, bananas, pineapple, persimmon, tomato, pear, melon, apple and various tropical fruits); Mack, 1927 (celery); Chace and Church, 1927 (fruits); Chace and Sorber, 1928 (canning pears); and later Rodiguez, 1932 (fruiting of the pineapple); Sorber, 1934 (hulling walnuts); Finch, 1937 (hulling pecans). Many others, too numerous to mention here, have contributed greatly to the details of the commercial development of this procedure for hastening maturity of plant organs. Kaltenbach, 1938, surveyed this literature and has summarized the details for ripening fruits with ethylene.

About the time when kerosene stoves were being used to hasten the coloration of citrus fruits, it was observed by Cousins (1910) in Jamaica that bananas ripened faster if they were stored with oranges. Since this effect was attributed to that of mixed fruit storage, the practice was discontinued with no more consideration.

### *How Ripe Fruit Stimulates Ripening*

Early in this century when the demand for bananas became greater, the United Fruit Co. experienced the first reported storage effect of ripe fruit mixed with green fruit of the same kind. It was noticed that the more mature bananas (i.e., older on the plant), though green when loaded aboard ship, would ripen during the trip from the tropics and affect normal fruit adjacent to it in the same compartment so that it would be too tender to be handled and to be distributed to the consumer. Forced ventilation used alone and later in conjunction with refrigeration was found to be economically successful in controlling the ripening of the fruit aboard the ships. At a subsequent time, it was found that the number of "ship ripes" varied directly with the percentage of carbon dioxide produced by the respiration of the bananas. Although the nature of the substance causing "ship ripes" was not determined, it was concluded that the percentage of carbon dioxide was an index of this unknown substance, which appeared to be a byproduct of the banana. Thus was established the practice of forced ventilation of the banana ships to eliminate this unknown substance.

In 1923, Ridley, of the United Fruit Co., demonstrated in a controlled manner that something produced by ripening bananas would accelerate the ripening of green bananas, but this substance was not any of the then known byproducts of the metabolism of the banana. The product not being identified, it was spoken of as "X-gas".

The next report upon this unknown substance was made by Chace and Sorber in 1930, when they observed

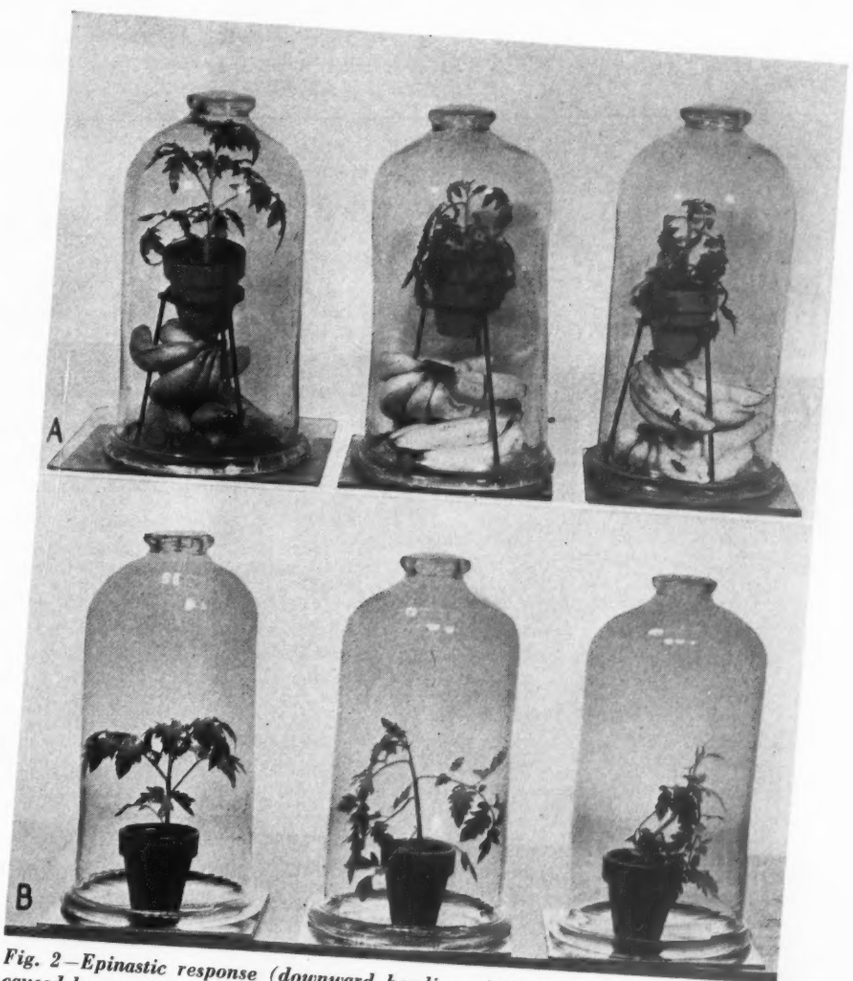



*Fig. 2—Epinastic response (downward bending of the leaves) of tomato plant caused by emanations from bananas and by pure ethylene during a period of 20 hours. (A) Left to right: Bananas fully green; bananas green with yellow undercolor; and bananas with full yellow color. (B) Left to right: Control plant, no ethylene added; ethylene added, 1 part in 22 million; and ethylene added, 1 part in 2 million.*

that a byproduct substance from ripening pears would accelerate the rate of softening of green pears.

Elmer, 1932, reported that apples gave off a gas that inhibited the sprouting of potatoes, and from this discovery was initiated the finding that ethylene is produced by plant tissue.

Huelin, 1933, found that the byproducts from ripening apples and pure ethylene had similar effects upon the sprouting of potato tubers, so he concluded that the substance produced by the apples was ethylene. Oortwijn Botjes, 1933, showed that ripening apples would cause epinastic curvature of tomato petioles (the same as caused by bananas in Fig. 2), which was found to occur by Harvey, 1913, and Doubt, 1917, when some plants were exposed to ethylene in a concentration of 1 part in 10 million parts of air. As pointed out by Crocker, 1929, the detection of ethylene by the epinastic response of tomato plants has been of unestimable value not only to research workers but also to florists in detecting the presence of illuminating gas (ethylene is a constituent) leaking into the greenhouse before it destroyed the crops.

Crocker, Zimmerman and Hitchcock, 1932, in a review of their work on the effect of chemicals on epinastic response of tomato petioles, found only ethylene, propylene, acetylene, butylene and carbon monoxide to be effective, and of these ethylene was by far the most effective. Using tests of this nature it is possible to determine as little as 1 part of ethylene in 60 million parts of air. These investigators in a later publication, 1935, suggested that ethylene is a fruit-ripening hormone.

During the period 1932-35 it was the opinion of many investigators that no other part of the plant except the fruit, especially at a climacteric stage of ripeness, would produce ethylene as a byproduct of its metabolism. However, Denny and Miller, 1935, and Denny, 1935, showed that not only maturing but also immature fruits, seeds in green pods, parts of flowers, leaves, stems and roots produced emanations which caused epinasty of young potato plants similar to that obtained with low concentrations of ethylene.

Gane, 1934, using analytical chemical methods, identified ethylene as a product of metabolic activity of the apple. He estimated that one apple (200 grams) would produce one cubic centimeter of ethylene during its life. Denny and Miller, 1935, estimated that 2 grams of apple tissue produced a concentration of 1 part of ethylene in 20 million parts of air per day, which was enough to produce an epinastic response of the potato plant, and these results were in accord with the chemical determination made by Gane. Hansen and Hartman, 1935, using both chemical and plant epinasty methods, demonstrated the production of ethylene by ripening pear fruits. Nelson and Harvey, 1935, found that the Golden self-blanching variety of celery produced emanations causing epinastic curvature of the tomato petiole, in readily detectable amounts, but they were unable to obtain similar results with the Winter Green variety, which is not a self-blanching type. Finch, 1937, demonstrated that the shucks of pecans produced ethylene-like emanations at the time they were peeling from the pecan shells. And Isaac, 1938, reported that peaches and plums produced, for a period of seven days during their ripening, an active emanation similar to ethylene.

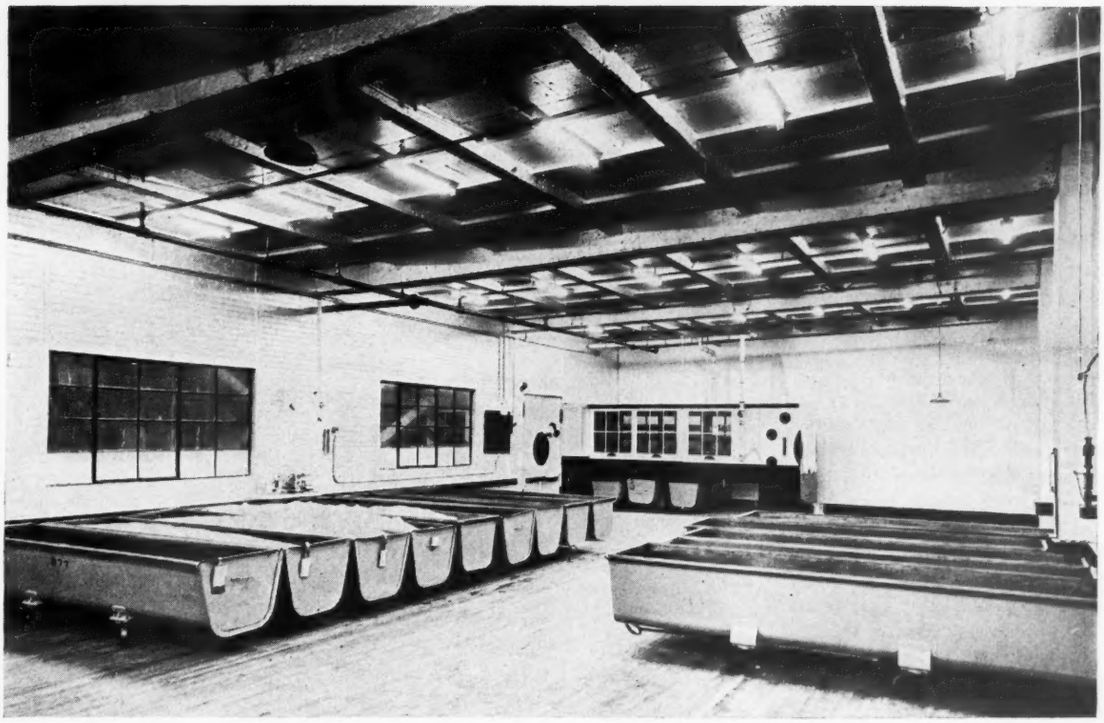
Niederl and Brenner, 1938, and Niederl, Brenner and Kelley, 1938, using micro-chemical methods, isolated ethylene from the air surrounding ripening bananas, and they determined that 0.1 and 0.2 c.c. of ethylene was produced by 100 lb. of fruit. By their method they demonstrated that the active substance in the emanations of the ripening banana was only ethylene and not some other olefine such as propylene or butylene. Nelson, 1938, determined by chemical analysis that the greatest production of ethylene by the banana occurred just as the fruit started to ripen and gradually decreased until little or no ethylene was produced when the fruit reached the completely ripe stage. Recently, Christensen, Hansen and Cheldelin, 1939, developed a microchemical method for the determination of ethylene in the internal atmosphere of plant tissue, and they found that ripe Grenstein apples contain from 0.022 to 0.063 c.c. of ethylene per 100 grams of tissue and Bartlett pears 0.008 to 0.029 c.c. per 100 grams of tissue.

In retrospect, the interesting story of the use of ethylene for ripening fruits and vegetables has four very important steps in its history: (1)

*(Turn to page 80)*

## LITERATURE CITED


1910. Cousins, H. H., *Ann. Rept.*, Dept. Agric. Jamaica. p. 7.
1912. Sievers, A. F., and R. H. True, U.S. D.A. Bur. Plant Industry. *Bull.* 232.
1913. Harvey, E. M., *Bot. Gaz.* **56**, 439-442.
1917. Doubt, S. L., *Bot. Gaz.* **63**, 209–224.
1922. Luckhardt, H. B., and J. B. Carter, *Jour. Amer. Med. Soc.*, **80**, 765–770.
1923. Denny, F. E., U. S. Patent 1,475,938, *Official Gaz. U. S. Pat. Office* 317, 82.
1923. Ridley, V. W., *Fruit Dispatch* **8**, 523–525.
1924. Chace, E. M., and F. E. Denny, *Ind. and Eng. Chem.* **16**, 339-340.
1925. Rosa, J. T., *Proc. Amer. Soc. Hort. Sci.* **22**, 315–322.
1925. Harvey, R. B., Minn. Agric. Exp. Sta., *Bull.* 222.
1925. ..... *Minnesota Hort.* **53**, 41–43.
1927. ..... *American Produce Grower* **2**, 20, 27, 28.
1927. ..... *The Chemical Bull.* **14**, 101, 125.
1927. Mack, W. B., *Plant Physiology* **2**, 103.
1927. Chace, E. M., and C. G. Church, *Ind. and Eng. Chem.* **19**, 1135–1138.
1927. Anonymous, *Jour. Amer. Med. Assoc.* **89**, 792–793.
1928. Harvey, R. B., Minn. Agric. Exp. Sta. *Bull.* 247.
1928. ..... *Minnesota Hort.* **54**, 140.
1928. Chace, E. M., and D. G. Sorber, *The Canner*, Sept. 15, 1, 16.
1928. Rosa, J. T., *Hilgardia* **3**, 421–443.
1928. Morgan, A. F., and L. L. W. Smith, Soc. Exp. Biol. and Med. *Proc.* **26**, 44–47.
1928. House, M. C., P. M. Nelson, and E. S. Haber, *Jour. Biol. Chem.* **81**, 495–504.
1928. Babb, M. F., *Science* **68**, 231.
1929. Crocker, W., *Florists Exchange & Horticultural Trade World* **70** (12) 15, 54.
1930. Chace, E. M., and D. G. Sorber, *Canning Age* May 30, 391–392, 408.
1930. Ramsey, A. A., and L. A. Musso. *Agric. Gaz. New South Wales* **41**, 382–383.
1930. Hibbard, R. P., Mich. Agric. Exp. Sta. *Tech. Bull.* 104.
1930. Jones B. D., and E. M. Nelson, *Amer. Jour. Public Health* **20**, 387–394.
1930. Clow, B., and A. L. Marlatt, *Jour. Agric. Res.* **40**, 767–775.
1930. Hirschfelder, A. D., and S. T. Ceder, *Amer. Jour. Physiol.* **91**, 624.
1931. Davis, W. B., and C. G. Church, *Jour. Agric. Res.* **42**, 165–181.
1931. Wolfe, H. S., *Bot. Gaz.* **92**, 337–366.
1931. Nelson, E. M., *Yearbook U. S. Dept. Agric.* 1931, 215–216.
1931. Englis, D. T., and F. A. Dykins, *Jour. Amer. Chem. Soc.* **53**, 723.
1932. Rodiguez, A. G., *Jour. Dept. Agr. Puerto Rico* **16**, 5–18.
1932. Elmer, O. H., *Science* **75**, 193.
1932. Crocker, W., P. W. Zimmerman, and A. E. Hitchcock, *Contrib. Boyce Thompson Inst.* **4**, 177–218.
1932. Bates, G. R., British So. Africa Co. Nazoe Citrus Exp. Sta. *Pub.* 2C.
1932. Allen, F. W., *Hilgardia* **6**, 381–441.
1933. Huelin, F. E., *Report for 1932*, Food Invest. Bd. Gr. Britain Dept. Agric., p. 51.
1933. Oortwijn Botjes, Je, *Tijdschr. Planenziek* **39**, 207–211.
1933. Morloth, R. A., *Farming in South Africa* **8**, 17–18, 21, 105–108.
1934. Sorber, D. G., U.S.D.A. Bur. Chem. & Soils (Los Angeles) Food Res. Div. *Contrib.* 213.
1934. Gane, R., *Nature* 134, 1008.
1934. Dustman, R. B., *Plant Physiol.* **9**, 637–643.
1934. Chace, E. M., *Amer. Jour. Public Health* **24**, 1152–1156.
1934. Eddy, W. H., private communication.
1935. Denny, F. E., and L. P. Miller, *Contrib. Boyce Thompson Inst.* **7**, 97–102.
1935. Crocker, W., A. E. Hitchcock, and P. W. Zimmerman, *Contrib. Boyce Thompson Inst.* **7**, 231–248.
1935. Denny, F. E., *Contrib. Boyce Thompson Inst.* **7**, 341–347.
1935. Hansen, E., and H. Hartman, Oregon Agric. Exp. Sta. *Bull.* 342.
1935. Nelson, R. C., and R. B. Harvey, *Science* **81**, 7, and 82, 133–134.
1936. Chace, E. M., and D. G. Sorber, *Food Indus.* **8**, 292–294.
1937. Hansen, E., and H. Hartman, *Plant Physiol.* **12**, 441–454.
1937. Finch, A. H., *Proc. Amer. Soc. Hort. Sci.* **34**, 74–77.
1938. Isaac, W. E., *Trans. Roy. Soc. S. Africa* **26**, 307–317.
1938. Niederl, J. B., and M. W. Brenner, *Mikrochemie* **24**, 134–145.
1938. Niederl, J. B., M. W. Brenner, and J. N. Kelley, *Amer. Jour. Bot.* **25**, 257–361.
1938. Nelson, R. C., *Amer. Soc. Plant Physiol. Absts. Papers*, 15th ann. meeting, Richmond, Va., Dec. 1938, p. 12.
1938. Kaltenbach, D., *Int. Rev. Agriculture* **29**, 81T–116T.
1939. Christensen, B. E., E. Hansen, and V. H. Cheldelin, *Ind. and Eng. Chem.*, Anal. Ed. **11**, 114–116.
1939. Hansen, E., *Plant Physiol.* **14**, 145–162.
..... Personal communication—United Fruit Co., New York City.



*Bakeries are licking the old and troublesome problem of mold by the use of ultraviolet. In this dough room, air-borne spores are killed by irradiation, preventing contamination of the product or mold growth on the walls.*

# ULTRAVIOLET Finds New Applications

*Bactericidal irradiation put to more and wider use in meat, baking, dairy, fish and fresh fruit and vegetable industries*

By T. R. PORTER

*Special Products Department,*
*Westinghouse Lamp Division, Bloomfield, N. J.*

*Mold-free storage conditions are provided for fresh fruits and vegetables by ultraviolet irradiation.*

AS with other important technological discoveries, germicidal ultraviolet irradiation is being put to more and more uses as additional industries find out how they can apply it to the solution of their particular problems.

Several practical applications of Rentschlerizing, or the Rentschler-James process (the process of killing mold and bacteria with the special wave length of ultraviolet generated by the "Sterilamp") have been described in previous issues of FOOD INDUSTRIES.* Since those applications were discussed, more has been done with the process in the meat and baking industries, and important new uses have been found in the dairy, fish and fresh-fruit and vegetable industries.

Kroger Grocery & Baking Co., Cincinnati; H. C. Bohack Co., Inc., Brooklyn; and Wilkinson, Gaddis & Co., Newark, N. J., have installed

large Renschlerizing coolers for the production of "Tenderay" beef. With a temperature of about 60 deg. and a relative humidity of 85 to 90 percent, beef is aged to a tender condition in three days. The role of the ultraviolet is to prevent spoilage by mold and bacteria on the surface. The relatively high temperature effects tenderization by speeding the enzymatic action, and the humidity prevents excessive shrinkage of the meat during the process. Proper air circulation is also required.

Chr. Kunzler Co., Lancaster, Pa., packer, installed Sterilamps in the beef cooler and reports that customers "have noticed an improvement in the length of time that they can keep beef purchased from us—and we can keep beef for a longer period than previously."

Sterilamps were installed in a walk-in cooler by Media's Terminal Market, Media, Pa., with the result that "trimming losses have been reduced from approximately 6 percent to less than ½ of one percent, and our shrinkage cut to an equally negligible figure." Mold and slime have been eliminated and the safe keeping time of the meats more than doubled. Then,

*In this bakery the cooling, slicing and wrapping operations are irradiated to reduce contamination by air-borne mold.*

*Protected against mold and bacteria by ultraviolet irradiation, beef is tenderized by aging for three days at a relatively high temperature and humidity. Recent installation of "Tenderay" process by Wilkinson, Gaddis & Co., Newark, N. J.*

a higher temperature is possible in the cooler.

As applied to bakeries, the Rentschler-James process includes:

1. Irradiation of the dough room and proofing room to kill the mold and yeast spores floating in the air.
2. Irradiation of the baked goods during passage from the oven to the cooling room.
3. Irradiation of the product on the cooling racks or the supplying of irradiated air to conveyors.
4. Irradiation of the knives and other parts of the slicing machine.
5. Irradiation of the area or room where the product is wrapped.

At the Twentieth Century Bakery, Haverhill, Mass., difficulty had been experienced in keeping the walls of the dough and mixing rooms neatly painted because of the destructive action of mold, which caused discoloration and disintegration of the paint. This is not an unusual condition, considering the temperature differential between the wall surface and the air in such rooms and the resultant condensation.

This condition can be partially overcome by insulating the wall to reduce the temperature differential. At Haverhill, insulation was applied to the dough room walls, and, in addition, 24 Sterilamps were installed on the ceiling—one lamp for each 60 sq. ft. of floor area.

This installation keeps the air in the room practically sterile, and no mold has been observed on the walls. Because of the lack of penetration, such radiation will not affect the development of the yeast in the dough. Since Sterilamps were installed, the dough room has ceased to be a problem, either of sanitation or painting.

The mixing room adjoins the dough room, and hence was a trouble spot due to the entry of warm air, laden with mold spores, from the dough room. Eight of the ultraviolet lamps were installed along the ceiling and the trouble was eliminated.

A similar installation was made at Koepplinger's Bakery in Detroit last summer. This company reported "no mold whatsoever" although the bread

---

* Mold and Bacteria Killed by New Lamp, June, 1936, page 295.
Another Example of Supermarket Progress, October, 1937, page 596.
A New Process Goes To Work, May 1938, page 263.
How To Apply Rentschlerizing, June, 1938, page 327.

was out three or four days in hot weather.

The Kroger Baking Co. in Columbus, Ohio, has been using Sterilamps for the past three years in its cake baking department, and its returns from moldy cakes have been nil.

Cheese manufacturers are all acquainted with the mold problem in manufacturing, aging and packaging of the product. Cheese is an ideal medium for the propagation of spores settling on its surface. One manufacturer who installed Sterilamps in the aging room has "eliminated the mold condition, and our aging room is in a clean, sweet condition with no noticeable odor." This manufacturer formerly had considerable trouble with mold in aging the product.

Other installations in this field include general irradiation of processing rooms and localized irradiation over the individual processes.

In packaging cream cheese and other prepared cheeses, ultraviolet lamps are being used to reduce the contamination on the surface of the liner in the package prior to filling, and also to irradiate the top surface of the cheese after filling and prior to the sealing of the package. Such installations have been successful in reducing the number of returns of packages of moldy cheese, benefiting the manufacturer, the dealer and the ultimate consumer.

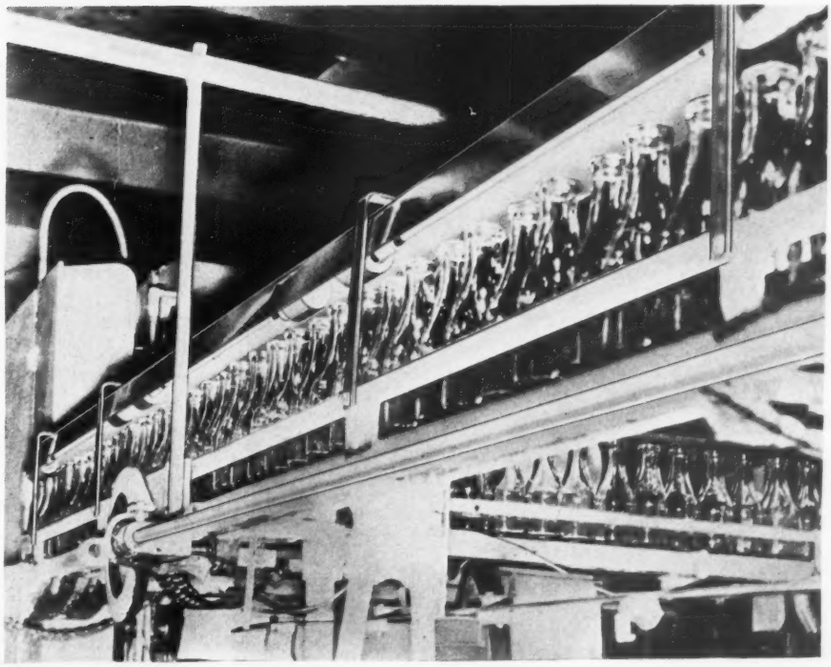
Careful investigation has been carried out on the use of the Sterilamp to enhance the keeping quality of fish, and these studies have uncovered such interesting evidence that research work on the problem is being continued. A progress report was recently issued by the Pacific Biological Station of the Fisheries Research Board of Canada, in which the investigators reported that reduction of bacterial contamination on fillets was evidenced with only a 5- to 10-minute exposure. They also stated that such radiation had a possible use in reducing the bacterial population in brines and pickling fluids in which fillets are frequently immersed and which serve as a serious source of contamination.

***Bactericidal ultraviolet irradiation has been put to work in the fish industry to reduce bacterial contamination on fish and fish products, keeping them fresh and salable longer. This shows "Sterilamps" in a refrigerated display case of Carter & Lanhardt Co., Municipal Fish Pier, Washington, D. C.***

Another report, issued by the U.S. Department of Commerce, Bureau of Fisheries, on the effects of ultraviolet irradiation of haddock fillets, disclosed the fact that the irradiation may be of considerable value in two commercial applications. These applications include: (1) The use of ultraviolet lamps for irradiation of fillets, during and immediately after production, to reduce the incidental contamination by bacteria. The irradiation would substitute for or supplement the washing of fillets in sterile water or germicidal solutions. (2) Irradiation of fillets after arrival at retail stores.

The lamps can also be placed advantageously over and under conveyors used in the operation of fish filleting, and sufficient information is available to warrant their use in lowering the bacterial contamination on table tops, knives and other equipment employed in the fish industry. The success of the use of Sterilamps for the preservation of meat in retail-store coolers has lead investigators to believe that a similar application could be valuable in the fish industry, both in display cases and in coolers.

The first commercial installation of the lamps in fish display cases is already proving successful at the Carter-Lanhardt Co., Municipal Fish Pier, Washington, D. C. The owner states that the installation has considerably lengthened the time that fillets may be kept salable and that the usual fish odor in the cases has been almost eliminated.



***Milk bottles are kept sterile as they are conveyed from the washer to the filling machine in a Columbus, Ohio, dairy plant. "Sterilamps" over the conveyor do the trick.***

# Making Jelly by CONTINUOUS PROCESS

*Greater economy and better quality control follow replacement of batch methods by continuous process*

By

**GEORGE L. BAKER**

*Delaware Agricultural Experiment Station Newark, Del.*

and

**W. D. PHETEPLACE, Jr.**

*The Pfaudler Co., Rochester, N. Y.*

THE April, 1939, issue of FOOD INDUSTRIES carried a very interesting article by Dr. G. T. Reich[12] on the conversion of the batch operation in jelly making to a continuous process. Dr. Reich carefully analyzes jelly making and illustrates by a series of charts the cooking operation. The factors of acidity, time and temperature are applied to the rates of evaporation of water and the inversion of sugar necessary to prevent crystallization in jellies. Dr. Reich's discussion has stimulated the interest of the present authors and they now wish to present their ideas on a continuous process of jelly making as developed at the Delaware Agricultural Experiment Station and adapted for the most part to glass-lined or other corrosion resisting equipment.

Commercially, jelly making in the last few years has become a standardized procedure. The fruit is washed, comminuted and cooked. In this latter operation, the proportion of fruit to water, acid (or pH) adjustment, and time and temperature of extraction cooking is carefully controlled in order to develop natural pectic values[1] without excessive injury to colors and flavors. After the extraction cook, the juice is pressed out with a hydraulic press, clarified, then pumped to storage tanks. Pectin is only added when necessary to fulfill the requirements of the usual 50 lb. jelly juice to 50 lb. sugar relationship. Blending of high and low viscosity juices is practiced to accomplish the same result. The jelly is cooked in batches, at the most 50 gal., to the correct concentration of soluble solids and then run into containers. The small batch is used because of the need for a short rapid cook to hasten evaporation.

Through the use of the vacuum pan the jelly industry has speeded up production with no loss in quality of product. With careful viscosity and pH control it is possible to regulate pectic and acidity values and take advantage of low-temperature evaporation.[11] Finishing temperatures well below that of approximately 221 deg. F., which is used in the open-kettle method, assure an improved product with a minimum of destructive action due to oxidation and high temperatures. Jellies of better color and flavor are a result.

It is well known that with the proper proportions of the three essential factors in jelly making—pectin, acid and sugar—a jelly can be made in the cold. However, few fruits can be extracted in such a manner that the pectin proportions in the fruit juice extract are correct for cold jelly making. If it were possible to extract and concentrate fruit juices by either freezing methods or vacuum evaporation, without pectin deterioration, to the point where their pectic values will fulfill the requirements for cold jelly making, that is to a 1:1.5 juice to sugar ratio, it is apparent that the basis for a continuous process would be established. The addition of the sugar to the juice with heat sufficient to assure perfect mixing and blending would be all that is necessary to complete the process.

The concentration of most fruit juices by freezing or by vacuum evaporation without loss of color or flavor is now possible. The freezing concentration is theoretically a perfect operation because only ice will be removed, and dissolved solids and coloring will be concentrated without loss of quality. Gore[6] suggested slow freezing with the formation of large ice crystals and the separation of the crystals by centrifugal action. Irish[7] used freezing with agitation. Zorn and Eickhoff[17] have a patented machine where ice crystals formed by surface freezing are removed from the fruit juice as they are formed. Experimental work at the Delaware Agricultural Experiment Station upon the concentration of fruit juice by freezing proved satisfactory in removing 60 percent of the original volume without injury to the flavor or color.

VACUUM evaporation of fruit juices has proved more popular due to lower costs. Mottern[9], and Tressler, Joslyn and Marsh[16] review the methods of vacuum evaporation and the systems for reimpregnating fruit juice concentrates with their esters. These reviews, and the study of Carpenter and Smith, indicate that vacuum evaporation of a fruit juice to 25 or 30 percent soluble solids content, or to 40 percent of its original volume, is simple, and that by proper ester impregnation small loss of flavor and color occurs.

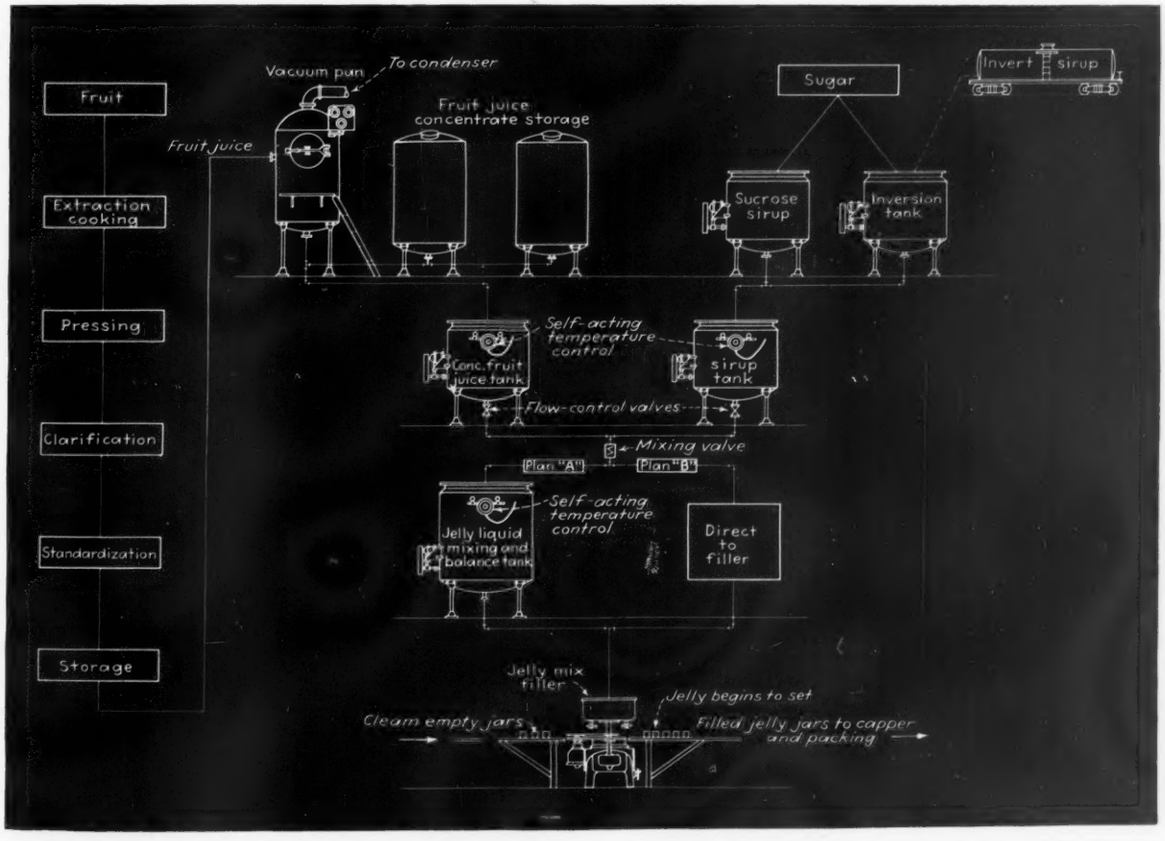
Published with the approval of George L. Schuster, Director, Delaware Agricultural Experiment Station.

If it is assumed that in developing conditions for a continuous process the acid and sugar factors may be easily controlled in a jelly mixing chamber, our primary concern is with pectin. Does freezing or vacuum evaporation concentration injure the pectin? Experiments prove that freezing concentration does not affect pectic value. Pectic values increase in direct proportion to the degree of concentration. On the other hand, vacuum evaporation of extracted apple juice at 160 deg. F. to 24 percent soluble solids decreased pectic value by nearly 10 percent. High temperature was largely responsible for this decrease. With higher vacuum and evaporation temperatures below 125 deg. F., the temperature effect upon pectic values was not injurious.[10]

It is only with careful viscometric control of extracted fruit juices that the continuous process will become a success. Fruit juices vary in pectin values far more than in characteristic soluble solids content. Seasonal and age factors as well as extraction methods influence the pectin present. It is a simple procedure to clarify the extracted fruit juice by filtering with a filter-aid, and then to standardize the pectic value of each juice to a definite sugar-supporting value in terms of viscosity previous to concentrating. A 1:1 ratio or any other acceptable proportion of juice to sugar may be taken as standard. Acceptable viscosity values will vary with the different fruits due to those soluble solids which affect viscosity; however, these variations will be slight. Tables or curves showing the quantity of a 100-grade powdered pectin necessary to increase viscosities of the respective fruit juices to a standard requirement may be easily made to fit each manufacturer's condition.[1] Standardizing by blending low viscosity juices with those of high viscosity will preserve uniformity of flavor, color, and solids content. After the pectic value of the extracted juice is properly standardized, the calculated degree of concentration is accomplished by either freezing or vacuum evaporation (reimpregnating the esters). The concentrate is then pumped to storage tanks or to the mixing device.

A PROPOSED factory layout and scheme for operation of a continuous process using sugar sirups is shown in the diagram. Upon leaving the mixing valve, one of two plans may be followed: Plan "A", the preferred method, where a jelly liquid mixing and balance tank is used; and Plan "B", where the jelly is fed direct to the filling machine. Plan "A" is used when the usual slow-set pectin has been employed for standardization of the juices. Plan "B" is used when there has been added an abundance of pectin, especially quick-set pectin.

The calculated degree of concentration of the fruit juice depends upon the manner of adding sugar. When crystalline sugar is to be added, in order to maintain a ratio of 50 lb. fruit to 50 lb. sugar (45 fruit to 55 sugar is minimum), a fruit juice containing 10 percent soluble solids must be concentrated to 69.2 percent of its original volume or to a 14.4 percent soluble-solids content. When liquid sugars are to be added, assuming, for example, that 80 percent soluble solids are present, a similar juice must be concentrated to 44.2 percent of its original volume or to 22.6 per cent soluble-solids content. Either of these concentrates are easy to obtain and present no unusual problems. At these concentrations, sugar and juice may be brought together, resulting in 65 percent soluble solids in the mixture. These concentrations represent minimums. In actual operation, a soluble-solids content 0.5 percent higher than given here should be




*Continuous jelly manufacture, as described in this article, could be carried out in accordance with this flow diagram.*

taken in order to maintain a tolerance of plus or minus 0.5 percent total solids measured by a refractometer. A tolerance of even 1 percent in the soluble solids content of the concentrated fruit juice would not be excessive, because it would be expected to cause only a similar 1 percent change in strength of jellied products.

WHEN ready for mixing, measured quantities of juice and sugars are transferred to the jelly mixing tank (see diagram) under careful control. Sugar proportions must be measured carefully because the concentration of sugars (the dehydrating agent) in the finished jellies affect jelly strength greatly, with the tolerance maintained at plus or minus 0.5 percent of calculated values or better. In the continuous process, dry or liquid sugars may be used. Sugar sirups of various strengths are available commercially or may be prepared as needed. Large jelly manufacturing concerns may find it advantageous to prepare their own invert sirups in accordance with the methods of Schaal and Johnson[13] or some standard reference formula (Campbell[2]). Inversion is rapid above 160 deg. F. and at relatively high acidities. Mixtures of sucrose sirup, invert sirup or dextrose[5] sirups may be used. The presence of 20 to 30 percent of invert sugar prevents the formation of sugar crystals in the jelly upon aging.

Following Plan "A", mixing temperatures must be maintained at 160 deg. to 180 deg. F., depending on pectins which have been used, otherwise gelation would take place because the acid, sugar and pectin proportions are correct for jellies at room temperatures. In the case of dry sugars, an instant boiling aids solution and clarity; inversion may then be allowed to proceed at 180 to 190 deg. F.[12] until at least 20 percent of invert sugar has formed. The rate of inversion depends upon such factors as pH, salt and pectin concentrations and temperature; therefore, the rate will vary with manufacturing conditions. The temperature must be maintained at approximately 160 deg. F., which is above the jellying point for most mixtures, for mixing and proper solution and in order to assure passage of the hot jelly liquid through the container filling machine. Where short pipelines are maintained between the jelly mixing and balance tank and the filling machine, the temperature regulator can be set to maintain slightly lower temperatures. The system must be a closed one from the vacuum pan through to the filler in order to prevent evaporation.

The length of time that the jelly mixture will have to stand in the jelly liquid mixing and balance tank before going to the filling machine may run to 30 minutes or more. This time of standing will not appreciably affect the jelly strength.[14] Nor will the increased concentrations of invert sugar be detrimental, as Cole, Cox and Joseph[4] point out. Experimental results at the Delaware Station[15] indicate that if there is 15 percent invert sugar in the sirup at the start, the finished jelly should not be expected to contain more than 30 percent of its sugar as invert even though 30 minutes were required to pass through the system.

Finally, in connection with the maintenance of these temperatures above 160 deg. F., sterilization is a factor. According to Jones and Jones[8], the majority of molds are destroyed if a temperature of 149 deg. F. is maintained for 10 minutes. The high sugar content and the use of proper closure equipment will also minimize danger of spoilage from molds.

While the process as outlined has not been used commercially, it has repeatedly proved successful in the laboratory. In this case, the laboratory unit processes are easily translatable into plant practice. It is obvious that jelly making need no longer be a batch process. Continuous process jelly manufacture offers the opprotunity for better quality control as well as the handling of larger volumes with greater economy.

### References


1. G. L. Baker, Extraction and Standardization in Fruit Jelly Manufacture, *Food Manufacture*, 12, 147, 1937.
2. C. H. Campbell, *Campbell's Book—Canning, Preserving and Pickling*, 1937.
3. D. C. Carpenter and E. C. Smith, Apple Juice Concentrate, *Industrial and Engineering Chemistry*, 26, 449, 1934.
4. G. M. Cole, R. E. Cox and G. H. Joseph, Does Sugar Invasion Affect Pectin Jelly Formation? *Food Industries*, 2, 219, 1930.
5. C. R. Fellers, J. Miller and T. Onsdorff, Dextrose in the Manufacture of Fruit and Vegetable Products, *Industrial and Engineering Chemistry*, 29, 946, 1937.
6. H. C. Gore, Apple Sirup and Concentrate Cider. *U. S. Dept. of Agriculture Yearbook*, 227, 1914.
7. J. H. Irish, Fruit Juice Concentrates, *California Agricultural Experiment Station Bulletin*, 392, 1925.
8. Jones and Jones, *Canning Practice and Control*, p. 213, 1937.
9. H. H. Mottern, Concentrated Apple Juice, *Fruit Products Journal*, 17, 68, 1937.
10. P. B. Myers and G. L. Baker, The Viscosity and Jellying Properties of Pectin Solutions, *Delaware Agricultural Experiment Station Bulletin* 149, Tech. No. 8, 1927.
11. W. D. Phetaplace, Jr., Vacuum Cooking, *The Glass Lining* (Pfaudler Co.), 9, 4, 1935.
12. G. T. Reich, Converting Batch Operation to Continuous Process, *Food Industries*, 11, 183, 1939.
13. A. A. Schaal and O. Johnson, Standardized Inversion of Cane or Beet Sugar Gives Results with pH Control, *Food Industries*, 1, 226, 1929.
14. L. W. Tarr, Jelly Strength Measurements, *Delaware Agricultural Experiment Bulletin* 142, Tech. No. 5, 1926.
15. L. W. Tarr and G. L. Baker, The Role of Sugar, *Delaware Agricultural Experiment Station Bulletin* 136, Tech. No. 3, 1924.
16. D. K. Tressler, M. A. Joslyn and G. L. Marsh, *Fruit and Vegetable Juices*, 1939.
17. W. M. Zorn and T. H. Eickhoff, *Method of Treatment and Concentration of Liquids by Freezing*, U. S. Patent No. 1,999,712, April 30, 1935.


## How to Get the Most Out of Your Lights

Lighting systems, like any production equipment, require a certain amount of attention if they are to function efficiently. No matter how well the system is designed, the actual cost of lighting or the effective illumination produced with a given capital investment and current consumption, depends largely on maintenance. Here are some pointers that will assist in keeping light output as nearly as possible at its original value:

1. Always burn lamps at their rated voltage. Too high a voltage will reduce lamp life. Voltages 5 per cent below lamp rating decrease light output 15 per cent.
2. When replacing burned out lamps be sure the new lamp has the correct voltage rating and wattage, and is suitable for the service. Ordinary lamps should never be exposed to severe vibration and shocks.
3. Replace lamps when they show signs of becoming blackened. When this happens, efficiency falls rapidly.
4. Never use large lamps in reflectors designed for smaller lamps. Under these conditions, light output is seriously reduced.
5. Dust removal is one of the most important factors in lighting maintenance. Experience has shown that illumination will be increased 20 to 25 per cent, if bulbs and fixtures are wiped free of dust at least once a month and washed every 60 days. Cleaning must, of course, be done oftener where the fixtures are located in unusually dirty locations. Soap and water are ordinarily used for this purpose, although stronger cleaning agents are sometimes needed. After washing, the reflectors should be rinsed in ammonia water and thoroughly dried to insure removal of any film to which dirt will adhere.
6. Keep walls and ceilings clean. Properly designed lighting utilizes the reflecting properties of light-colored paints on these surfaces to increase the effectiveness of illumination. Grime and dirt defeat this purpose. When repainting, avoid glossy surfaces because of their tendency to glare, and where possible use colors having high light reflecting value.
7. Make periodic lightmeter surveys to determine adequacy of lighting and to detect depreciation. Pocket-size meters are now available for this purpose and will pay for themselves many times over in saving eyesight, reducing accidents, and preventing needless spoilage of product.

—S. H. COLEMAN, *Roanoke, Va.*

CARBONATED BEVERAGES
Empties from Trucks or Storage
Bottle Washing
Inspecting
Syruping
Filling
Closing
Mixing
Extracts
Mixing
Mixing
Empty Cases
Case Inspecting and Repairing
Heat Exchanger
Filtering
Cold Water
Water
Dissolving
Sugar Storage
Pumping
Inspecting
Labeling
To Casing Warehouse or Trucks
Water Softening
Water from Service
Carbon Dioxide Cylinders
Heating
Carbonating
Cooling to 35°F
Polishing Filter
Activated Filtering Carbon Purifying
Alkalinity Reducing
Carbonated beverage manufacture involves chiefly filtration, mixing, packaging and material handling. Sanitary control is, of course, also very important here as it is in dairies, breweries and fruit juice manufacture.
Water for all purposes 40,000—50,000 gal.
Steam process steam 7,500—10,000 lb.
at 100 lb. press.
Power excluding light 400—500 kw.-hr.
Labor 80—100 man-hr.
Sugar 2,000—2,700 lb.
Carbon Dioxide 180—250 lb.
Yield: 1,000 cases 24—12-oz. bottles

*Fig. 3. A "large area, indirect unit" employing silvered-bowl lamps produces a high level of well-diffused illumination for this inspection operation.*

# What is GOOD LIGHTING?

## *The what's, why's and how's of adequate plant illumination*


**By HARRIS REINHARDT**

*Commercial Engineering Department, Westinghouse Lamp Division, Bloomfield, N. J.*


CLEANLINESS is possible only when good seeing conditions are provided through the use of adequate illumination. Poorly illuminated spots and shadows always produce an appearance of dinginess, and this appearance is seldom misleading, since these spots make ideal hiding places for dirt. A well-lighted interior, on the other hand, makes dirty tables, machines or utensils so conspicuous that the workers are prompted to keep them cleaner, if for no other reason than to forestall possible criticism.

Other benefits of improved lighting include improved quality of the product, decreased spoilage, increased production and reduced accidents.

Production increases (including decreased loss due to spoilage) ranging from 10 to 35 percent have been reported from lighting installations that cost from 2 to 3 percent of the payroll. Accidents have been reduced as much as from 5 to 20 percent.

Good industrial illumination must conform to these requirements:

1. An adequate level of illumination must be provided.
2. Glare must be avoided.
3. The light must be properly diffused, directed and distributed.
4. The color of the light must be suitable.

The level of illumination considered adequate for various types of operations may be obtained from tables such as those published by the Illuminating Engineering Society in its pamphlet entitled, "Recommended Practice of Industrial Lighting."

The portions of these standards which apply to the food industries are shown in Table I. It will be noted that candy making has been treated in much greater detail than any of the others, this being due to the fact that the I.E.S. recently sponsored an extensive study of lighting in this industry. Similar studies in other industries are now under way.

In connection with the values recommended in Table I, it is interesting to note the results of a recent survey of actual lighting conditions in industry. This revealed the fact that the average level of illumination in all industries in this country is only 7½ foot candles. Less than ten years ago, however, a similar survey disclosed an average level of only 3 foot candles.

The level of illumination in any plant may be checked readily by means of a light meter. Good lighting, however, is not simply a matter of supplying a certain recommended foot candle level of illumination, since the effectiveness of this illumination for seeing will be lost to a large extent if the lighting fails to meet the other requirements of good illumination. Glare, for example, because of the impairment of seeing ability and the resultant feeling of discomfort, nervousness and fatigue which it produces, is one of the most serious defects of a lighting system, and one of the first things to look for in evaluating any lighting system.

One of the most common sources of glare is a bare or inadequately shaded light source. This is known as direct glare and is usually fairly easy to correct through the use of the proper reflecting equipment. Reflected glare results when images of the light source are reflected into the eyes from polished surfaces in the field of view. Frequently these polished surfaces are a necessary part of the industrial operations involved, and the reflected glare must be eliminated through the proper distribution, direction and diffusion of lighting.

Proper distribution, direction and

diffusion depend mainly on the correct selection and use of the reflecting equipment. These factors may be thought of as determining the quality of the lighting, in contrast to the wattage of the lamps which determines the level of illumination or quantity of light.

Proper distribution requires that the entire room be lighted to a substantially uniform level of at least one-tenth the maximum level provided by the local lighting units. In locations where the visual work is not particularly severe or prolonged, the general lighting alone may be sufficient. But for tasks which require a higher level of illumination, a combination of general and supplementary, or local, lighting units is the most satisfactory arrangement. In some instances it is possible to supply the higher level of lighting required in the area of a machine or work table by mounting the general lighting units lower than normal in these areas and spacing them so that the light is used to the greatest advantage. An installation of this type is illustrated in Fig. 1.

General lighting for most industrial plants is provided by means of lighting units spaced uniformly throughout the area to be lighted. Because of their durability and the ease with which they may be kept clean, porcelain enamel reflectors have long been favored for plant lighting. The RLM dome reflector is a popular unit of this type. These reflectors are made by a number of different manufacturers in accordance with specifications set up by the RLM (reflector and lighting equipment) Standards Institute. These units are available in sizes ranging from 100 to 150 watts and are suitable for use with either white-bowl or inside-frosted lamps.

*Fig. 1. RLM standard dome reflectors mounted directly over the work table and spaced 8 ft. apart, an illumination of 20 foot-candles for this inspection operation.*

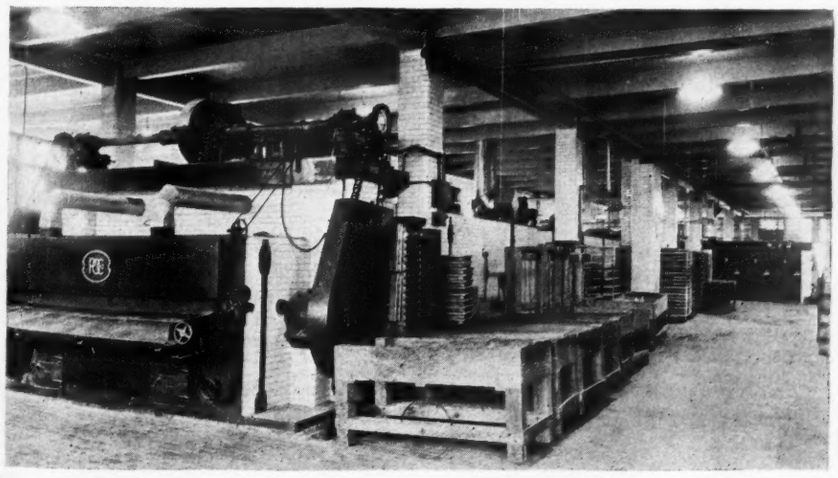


*Fig. 2. Glassteel diffusers equipped with 200 watt lamps are used for the general illumination in this baking plant.*

Another popular lighting unit is the Glassteel diffuser, which is similar in shape to the RLM dome reflector, but is provided with a large white glass diffusing bowl which completely surrounds the lamp. This produces greater diffusion of the light, softens the shadows somewhat and reduces the danger of glare. There is a number of slots in the top of the reflector which permit some light to escape upward. This is particularly desirable if the area has a flat ceiling, since it eliminates the contrast which would exist if the ceiling were entirely dark. The reflector is finished on both the inside and outside with white porcelain enamel, and this, together with the diffused character of the light which it produces, gives an appearance of cleanliness which makes this unit ideally suited for many general lighting applications in the food industries. An installation of units of this type is illustrated in Fig. 2.

Lighting with RLM dome reflectors or Glassteel diffusers provides general illumination which is satisfactory for most requirements, if supplemented by adequate local lighting at points where critical seeing is necessary. In some types of work, however, a higher degree of diffusion may be necessary to prevent annoyance from reflected glare. The ideal solution in such instances would be a totally indirect system of illumination in which all the light is directed to the ceiling and reflected from it to the working areas. Lighting of this type is widely used in offices, drafting rooms and schools, but is seldom practicable in plant lighting because of the increased wattage required to produce a given level of illumination, and the fact that ceilings must be reasonably clear of exposed beams, pipes and skylights.

For applications where the ceiling conditions are such that indirect lighting is not feasible but the nature of the operation is such that highly diffused lighting must be provided, a large area unit such as the one illustrated in Fig. 3 has been developed. This unit uses lamps with the bottom portion of the bulb silvered, so that the light is directed upward to a large white canopy which serves the function of the ceiling in the usual indirect lighting installation. Other large area units are made up with lamps mounted behind a large white diffusing glass which provides a large luminous area of low brightness. Large area units provide a well-diffused quality of lighting and are particularly well adapted to inspection operations where lighting of a superior quality is always essential.

In any lighting system the paint

used on the ceiling and upper side walls of the room, as well as that used on the machines and work tables, is an important factor in obtaining good diffusion through the reflection of the light. As shown in Fig. 4, paints of different colors vary widely in the percentage of light which they reflect. A paint with a high reflecting value should be selected for the upper parts of the room. In general, a flat paint is preferable to one which is very glossy, since the latter may produce glare from reflection of the lighting units in the glossy surfaces. This applies particularly to table tops or parts of machines which are in the direct line of vision. Painting the dangerous parts of machines in a color which contrasts with the remainder may also be an important aid to safety.

The color characteristics of the light affect the appearance of objects and may be a very important consideration in certain types of applications. Mercury-vapor lighting, for example, is considered unsatisfactory for most of the food industries, because of the color distortion which it produces. Where light of daylight color is desired, daylight blue incandescent Mazda lamps, or ordinary Mazda lamps with color screens, may be used. By far the most efficient method of producing light which approaches daylight in quality is the daylight fluorescent lamp. And this characteristic, together with the diffused quality of the light, makes that lamp particularly well adapted to a number of applications where lighting of this type is required.

Fluorescent lamps are tubular light sources available in lengths of 18, 24, 36 and 48 in., rated at 10 watts per foot of length. Each lamp must be burned in conjunction with a suitable control unit normally concealed in the lighting fixture. Fluorescent lamps produce light through the action of ultraviolet rays from a low-pressure mercury discharge on certain powders, or phosphors, coated on the inside wall of the tube. These phosphors convert the invisible ultraviolet light into visible light of a color depending upon the characteristics of the phosphor. The lamps are available in daylight, in a white which approximates the light from an incandescent lamp, and all except the 48-in. size are also available in five additional colors—blue, gold, pink and red.

The RLM Standards Institute recently set up standards for a fluorescent lighting unit known as the RLM 48-in. twin-lamp fluorescent unit. This unit is designed to meet the needs of a variety of industrial applications. It has a porcelain enamel reflecting surface, and the lamps are connected to a central unit which corrects for power factor and stroboscopic effect. The total wattage is approximately 100 watts. There is, however, a slight distortion of certain colors, and since this may be objectionable in the food industries, it is advisable to put in a small trial installation to make sure that the color of the light is entirely satisfactory before proceeding with a more extensive installation.

Fluorescent lamps may be mounted in a trough type lighting unit. The daylight fluorescent lamp produces about three times as much light for each watt used as the usual incandescent lamp with a daylight blue globe, and since very little heat is radiated from the lamp, the light may be characterized as "cool" lighting. This makes the lamp particularly adaptable to applications where excessive heat would be objectionable. There is, however, a slight distortion of certain colors, and it is therefore advisable first to put in a small trial installation.

Every plant in which there is any question regarding the adequacy of the lighting system should avail itself of the service offered by utility companies and manufacturers of lighting equipment and lamps. These companies maintain staffs of lighting engineers who are available to conduct surveys of plant lighting conditions and make recommendations for improvements where this is advisable.

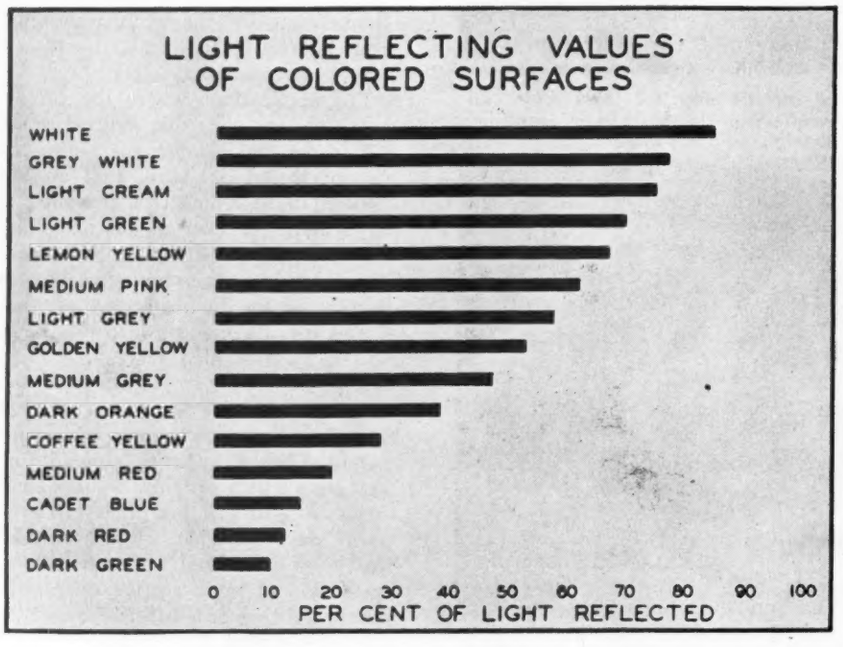



*Fig. 4. Percentage of light reflected by typical paints.*

**TABLE I — Recommended Minimum Standards of Illumination for Industrial Interiors**

*(These foot candle values represent order of magnitude rather than exact levels of illumination)*

| | Minimum foot-candles (On the work) |
|---|---|
| Aisles, stairways, passageways | 5 |
| Bakeries | 20 |
| Breweries: | |
| Brewhouse | 5 |
| Boiling, keg washing and filling | 10 |
| Bottling | 15 |
| Candy making: | |
| Box department | 20 |
| Chocolate department— | |
| Husking, winnowing, fat extraction, crushing and refining, feeding | 10 |
| Bean cleaning and sorting, dipping, packing, wrapping | 20 |
| Milling | C* |
| Cream making: | |
| Mixing, cooking and molding | 20 |
| Gum drops and jellied forms | 20 |
| Hand decorating | C* |
| Hard candy: | |
| Mixing, cooking and molding | 20 |
| Die cutting and sorting | C* |
| Kiss making and wrapping | C* |
| Canning and preserving | 20 |
| Dairy products | 20 |
| Meat packing: | |
| Slaughtering | 10 |
| Cleaning, cutting, cooking, grinding, canning, packing | 20 |
| Milling—grain foods: | |
| Cleaning, grinding and rolling | 10 |
| Baking or roasting | 20 |
| Flour grading | 30 |
| Packing and boxing | 10 |
| Receiving and shipping | 10 |
| Sugar grading | 30 |

* The seeing tasks in group *C* involve (*a*) the discrimination of moderately fine detail under conditions of (*b*) better than average contrast (*c*) for intermittent periods of time. The level of illumination required is of the order of 30 to 50 foot candles, and in some instances it may be provided from a general lighting system. Oftentimes, however, it will be found more economical, and yet equally satisfactory, to provide from 10 to 20 foot candles from the general system and the remainder from specialized supplementary lighting. The design and installation of the combination systems must not only provide a sufficient amount of light but also must provide the proper direction of light, diffusion and eye protection. And insofar as possible the design must eliminate direct and reflected glare as well as objectionable shadows.

# Claims the FTC WON'T LET YOU MAKE

*A check-list of Federal Trade Commission taboos in food advertising*

PASSAGE of the Wheeler-Lea Amendment in March, 1938, gave the Federal Trade Commission extended jurisdiction and more effective control over advertising which, in the Commission's opinion, is judged false and misleading. Particularly is this true of the advertising for food, drugs and cosmetics.

Copywriters, manufacturers and distributors have had many of their pet copy themes, after years of use, scrutinized and then rejected by the Commission. Advertisers, large and small, are daily being brought to task by the government for false or misleading advertising statements.

The food industry has not borne the brunt of the FTC attack, nor has it been singled out for criticism more than any other group. However, enough stipulations and cease and desist orders have been issued to enable food manufacturers to draw definite conclusions as to the Commission's attitude on certain advertising claims.

Careful research and compilation of all cases dealing with food products has resulted in a check-list of FTC taboos—advertising statements to which the Commission has objected in the past. Such a check-list will prove a valuable aid to all advertisers who are making a real effort to steer clear of any entanglement with the government agencies.

The list, in its entirety, follows:

### *Yeast Foods*

To cease representing that the product:

Will cure or prevent constipation, bad breath, boils, acne, pimples or other manifestations of irregular digestion.

Will "clear" skin irritants out of the blood, unless limited to such skin irritants as competent scientific tests prove can be removed from the blood by the product.

Prevents or corrects underfed blood, or increases the capacity of the blood to perform its functions.

## Part I


**By NATHAN R. ABELSON**

***Advertising Regulations Consultant, New York, N. Y.***


*(Fleischmann's Yeast, Stipulation No. 02180)*

### *Bread*

To cease representing that the product:

Contains all the necessary minerals required in the diet.

Provides for a balanced diet.

Is non-heating.

Contains no fat.

Is nonfattening irrespective of whether or not it is taken in excess of caloric requirements or used in connection with a diet exceeding caloric requirements.

Acts as a perfect regulator, relieves chronic constipation, removes coatings of waste poisons in the intestinal tract, helps regulate the system, provides perfect elimination or cures sluggishness and constipation.

Will completely remove the desire for starches and sweets.

Will, whether used in conjunction with a reducing diet or otherwise, enable persons to reduce any definite number of pounds within any definite time.

Is of any value in cases of obesity, or that users have achieved weight reduction by its use, unless it is stated, with equal conspicuousness, that it is merely an aid in the reduction of excess weight if used as a part of a proper reducing diet.

Will correct faulty diet.

Is a vitalizer or normalizer.

Will be of value in cases of high blood pressure or in gall bladder "conditions."

Will normalize or tone the system.

Is a competent treatment in the reduction of excess weight caused by an underactive thyroid.

Is a health building food or is a "magic" aid in promoting good health:

1. Through its content of vitamin A, or that vitamin A will increase resistance to infection irrespective of whether or not the ingestion of vitamin A is already adequate and the body reserve of this vitamin is being maintained.
2. By reason of its vitamin A content, or that vitamin A maintains normal glandular function.
3. Because of its vitamin E content, or that vitamin E furnishes nutrition to the muscles or promotes weight gain, or enhances physical and mental well being.
4. Because of its vitamin G content, or that vitamin G will prolong life or prevent skin disease.
5. Because of its vitamin B content, or that vitamin B aids in building nerve tissue or in promoting digestion, or is of value for anorexia, unless its value in this respect is expressly limited to cases of anorexia of dietary origin due to insufficient vitamin B.

Is of value in skin and complexion conditions, unless it is also stated that any value in this respect is confined to cases of skin and complexion faults due to improper eliminative conditions as would be benefited by the product.

*(Rhea's, Inc., "Manna Miracle Health Bread," Stipulation No. 02414)*

To cease representing that the product:

Contains whole milk, or pure, rich or certified milk.

*(Columbia Baking Co., Stipulation No. 2519)*

To cease representing that:

Bread is necessary in a reducing diet to burn up fats and sweets.

One may grow thinner yet eat anything, if bread, because of its ability to burn up damaging fats, is included in the diet.

*(Cripe Baking Co., "Rainbo Bread," Stipulation No. 02124)*

### *Candy and Lottery*

To cease:

Representing that the product is composed of malted milk.

Selling and distributing to dealers candies so packed and assembled that sales of the candy to the public are to be made by means of a lottery, gaming device or gift enterprise.

Placing in the hands of dealers assortments of candy which are used without alteration or rearrangement of the contents of the assortments or packages to conduct a lottery, gaming device or gift enterprise in sales.

Packing or assembling in the same assortment of candy, individually wrapped pieces of candy of uniform size and shape with different colored centers, together with packages or boxes of candy or any other merchandise, which packages or boxes of candy or other merchandise are to be given as prizes to the purchasers picking pieces with center of particular color.

*(Deran Confectionery Co., Cease and Desist Order No. 3111)*

Supplying punch boards, push or pull cards, or other lottery devices for the purpose of enabling to dispose of or sell any merchandise by its use.

*(Atlanta Candy Co., Stipulation No. 2612)*

### *Coffee*

To cease representing that:

A product is not as fresh as it could be if it does not have roasting date stamped on package.

A product not sold on or before the date stamped on the package is not for sale at any price.

The date stamped on the package indicates the length of elapsed time since the coffee was roasted and that ordinary systems of dating only measure the time from warehouse to consumer.

The advertiser's system of dating is "the only" system that has any meaning.

*(Kroger Grocery & Baking Co., Stipulation No. 02472)*

### *Tea*

To cease representing that product is selected from young tea leaves of the first picking.

*(Ho-Ro-Co Mfg. Co., Stipulation No. 02164)*

### *Flavoring—Soft Drinks*

To cease representing that the product, root beer flavoring, is nourishing.

*(Ho-Ro-Co Mfg. Co., Stip. No. 02164)*

To cease use:

Of the words "grape," "cherry," "strawberry" or "raspberry" as descriptive of the flavors of those products which are synthetically flavored and do not contain flavoring made from the fruit or juice of the grape, cherry, strawberry or raspberry, unless in each instance each word is accompanied by a word or words, equally conspicuous with it in character or type, clearly indicating that such flavoring is synthetic or an imitation of the genuine fruit flavor.

Of the term "fruity" or "purest ingredient" as descriptive of any product that is synthetically flavored to imitate the flavor of a fruit.

*(Perkins Products Co., "Kool-Aid," Stipulation No. 02312)*

### *Fruit Juice*

To cease representing that:

Sugar sirup is usually used in flavoring grapefruit juice, or implying that product is the only grapefruit juice to which dry sugar is added.

*(Kroger Grocery & Baking Co., Stipulation No. 02442)*

---

*Part II concluding this check-list of FTC taboos in food advertising will be published in an early issue of Food Industries.*—THE EDITORS.

Mr. and Mrs. William Madden
"My husband and I love dancing and good times . . ."
"When I was about 17, pimples began coming out on my face. It embarrassed me terribly because I danced a lot, played championship tennis and swam a great deal so that I was out in front of numbers of people very often.
"I got so upset I went to a doctor. He had me eat yeast to help get rid of the poisons in my system that were making my skin break out. He also had me use Calamine Lotion to dry up the pimples that had already come out. I certainly recommend his treatment. It cleared my skin up in just three weeks. I felt peppier, too.
"Since my marriage we have been living in the city. My husband and I both love dancing and good times, but lack of all the outdoor exercise I'd been used to got me feeling rather below par. So I've started in eating yeast again, because I know it will boost me up." MRS. WILLIAM MADDEN

*The FTC objected to the underscored lines in this portion of an advertisement for yeast.*

SHOCKING - THE WAY SHE'S AGED IN THIS LAST YEAR
SHE LOOKS 50 AT LEAST - AND I DON'T BELIEVE SHE'S MUCH OVER 40
Don't let that "OVER-40" look settle down on You too soon
Many people just past 40 look and act far older than their years.
This early aging may come from two common after-40 troubles.
1. Your body may not be getting enough vitamins. Older people need certain vitamins just as much as children do.
2. Poorer digestion—that often sets in around 40—may pull down your vitality. It also may keep the vitamins you eat from doing you all the good they should.
Both these troubles can be helped by Fleischmann's fresh Yeast. It gives you 4 important vitamins. The yeast itself acts like a "booster" for these vitamins. By helping to stimulate and strengthen digestion, it helps your system to take up the vitamins you eat faster and get more good out of them. And this improved digestion should make you feel better, more energetic.
Eat Fleischmann's Yeast ½ hour before meals, plain or dissolved in a little water. Do this every day to help you feel 10 years young!
Fleischmann's Yeast helps many "After 40's" Feel Younger

*Yeast advertisement (following date of stipulations) minus the elements tabooed by FTC.*

# Hints and Hurdles

### Reality Replaces Symbolism

GONE is the focal food exhibit from the building which during New York World's Fair 1939 was Food South and which at the 1940 Fair is the Coca-Cola Building. In the focal exhibit's place is a garden where visitors can sit in the shade on rustic benches to view rustic bridges over brooks flowing between banks of blooming flowers. Here visitors may rest and convince themselves that *it is refreshing*. And this will net Coca-Cola more immediate cash and more future dividends in good will than buildings full of focal exhibits whose value is in a symbolism beyond the grasp of all but an insignificant few.

Attendance at the exhibit this year verifies this fact. Both attendance and sales have been ahead of last year. On the first Saturday after the opening, Coca-Cola sales at the exhibit exceeded by 50 percent the sales of any day last year.

The primary purpose of a fair exhibit is to build good will—good will which is friendship—a friendly regard for a business, an industry or a product. Friendship, as we know it in our everyday life, is not founded on dissertations in Latin or Greek, but on the exchange of homely commonplaces in the realm of common interest. Business friendship is based on realities too, not symbols.

### Do We Want Dogmas or Truths?

ON MAY 13 and 14, National Association of Better Business Bureaus, Inc., held a "business-consumer relations conference on advertising and selling practices." During the first day of the conference those representing consumers expounded their views on the relations between consumers and business, as they are—and as they should be. On the second day, business representatives replied in kind, setting forth the business viewpoint.

The Monday audience was largely female, made up mostly of consumers. The Tuesday session was heavily masculine, with representatives of business. Both groups were more interested in hearing their own side extolled than in hearing the case for the other side. This is the way to breed and cultivate dogmas—not the way to give birth to and nourish truths.

### West Makes Eastern Beans

FOR GENERATIONS New England bean bakers have cooked and canned California beans and marketed them as Boston baked beans or New England baked beans. That is not news, just a case of "dog bites man." Now, however, California bakers are cooking and packing brick-oven New England style beans, no doubt from native legumes. Somewhat a case of "man bites dog." "Burbank Brown Crock Baked Beans," New England style, brick-oven baked, are the product of McKeon Canning Co., Inc., Burbank, Calif.

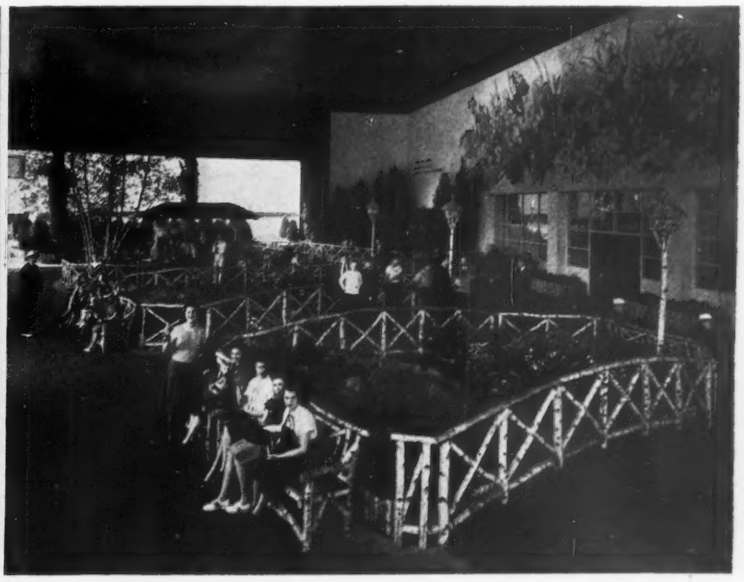
### "Competition is Life Blood"

AS THE MARKET for frozen fruits and vegetables has expanded, canners have become aware of the growing industry even to the extent of crediting sales shrinkage to frozen food expansion.

The frequent result when an old established industry is threatened with a new industry is improvements. It is not surprising that new methods in canning appear at this time.

Gibson Canning Co., Gibson City, Ill., has recently introduced "SterO-Vac" flash-cooked whole grain corn, sterilized in a fraction of the time normally required for canned corn. The resultant product is nearly enough like fresh corn to command a premium. This new development in canning was probably hastened by, if not induced by, the rapid growth of quick freezing.

*One of the symbolic portrails in the focal food exhibit at New York World's Fair 1939.*



*"Garden of Refreshment" at the 1940 Fair, replacing the 1939 focal food exhibit and building sales and good will for Coca-Cola.*

# Chip Steak Creates Acceptance For QUICK FROZEN MEAT

OF the five types of food sold frozen—vegetables, fruits, fish, poultry and meat—frozen meat has been least in demand. This in spite of several reasons why frozen meats should be more popular.

*A butcher removes the bone, trims away gristle and fiber and places the hunks of meat in metal molds under pressure to form what will, after freezing, be "logs" of meat.*

By IVAN C. MILLER
*Distribution Editor,*
FOOD INDUSTRIES

Frozen fruits and vegetables more nearly resemble fresh foods than processed foods. They are usually sold as fresh foods. When fresh fruits and vegetables are out of market or are scarce and high priced, there is a firm demand for frozen fruits and vegetables in those markets where they are offered. Meat, on the other hand, is sold fresh in almost every market throughout the country every day in the year. Meat is never out of market, and meat prices fluctuate between narower limits than do the prices of many fresh fruits and vegetables. It is probably because of this condition that frozen meat has the scant acceptance that it has—that coupled with the fact that there may have been less effort to create acceptance for frozen meat than for other types of frozen products.

Although frozen meat has not come into its own, there is evidence of a growing acceptance. As in the case of other types of frozen foods, institutional distribution is paving the way for consumer acceptance and, consequently, for future sales expansion.

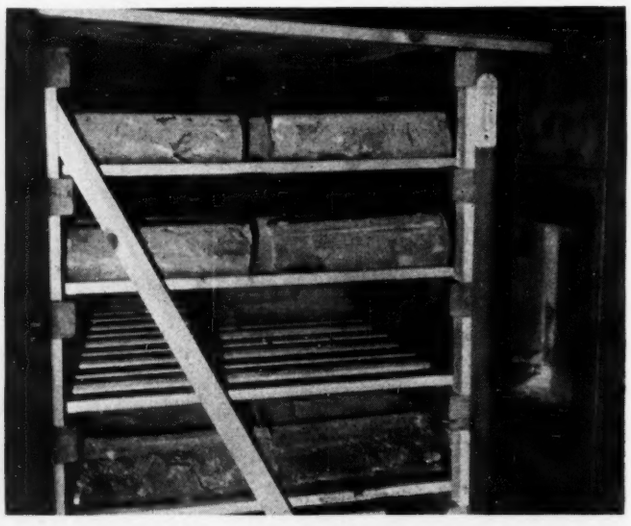
An indication of this trend is evident in the growth of franchised manufacturers of "Chip Steaks," the process for the manufacture of which was developed on the West Coast by National Chip Steak Co., Los Angeles. Franchised manufacturers are now producing and distributing these frozen steaks in many territories from the Pacific to the Atlantic. The most recent plants are Eastern Chip Steak Co., Newark, N. J., and New England Chip Steak Co., Boston.

The process for manufacturing Chip Steaks from beef is simple but none the less novel. Butchers take the meat from that portion of the hind quarter from which round steak is cut. They trim away cartilage, gristle and fibrous portions. Then they press the fiber-free, fat-free meat into molds, the diameter of which determines the size of the finished steak.

These "logs" of steak incased in metal molds are immediately subjected to low temperature refrigeration and are rapidly frozen. After the metal casings are removed, these frozen logs are held frozen in storage until ready to be sliced into steaks.

Just before slicing, the meat logs are placed in a room with a tem-

*After the meat is quick frozen, the metal cases are removed and the meat logs stored in low temperature rooms. Here also are stored packages of the finished product.*



*Before slicing, the logs of meat are held in a separate refrigerated room at a temperature slightly above freezing. This conditions them for slicing.*

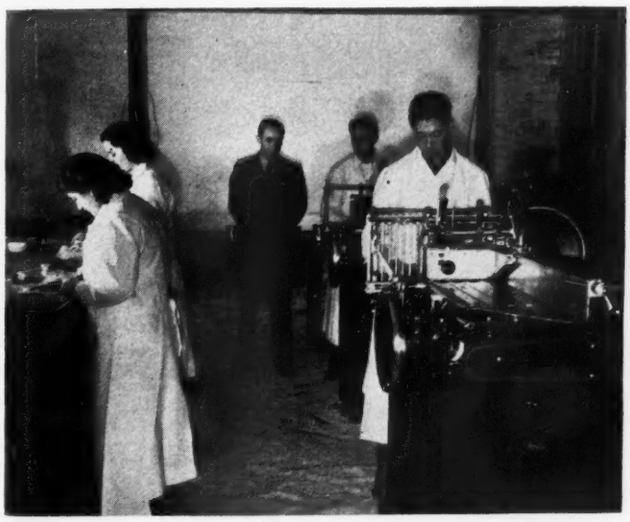
*"Chip Steaks" in two sizes, suitable for plate lunch steaks or sandwich fillers, are packaged individually, separated by waxed paper to prevent them from freezing together.*

perature just above freezing to condition them for slicing. They are then cut on a slicing machine into very thin wafers resembling in appearance slices of chipped beef. Slicing across the grain of the meat breaks up the fibers in the meat.

Approximately six of the wafer-thin slices make an individual Chip Steak. These slices fall on waxed paper and are stacked and packaged for either institutional or retail distribution. The paper separates one steak from another to prevent them from freezing together while they are held in low temperature storage. After packaging, the steaks are returned to the low temperature holding rooms where they are kept frozen, ready for distribution.

Lunchrooms and restaurants serving Chip Steaks as plate lunch steaks or in steak sandwiches were the first important users of this product. Chip Steaks became popular because they are boneless, tender, uniform in quality and amount and quickly prepared in a minimum time without waste. Stored in the well of an ice cream cabinet, they can be held for long periods without loss from shrinkage or spoilage. From the lunchroom and restaurant this product has migrated into many delicatessens and grocery stores equipped with low temperature cabinets.

As a result of the trimming, freezing and thin slicing, Chip Steaks are more tender than the meat from which they are made. Their acceptance would indicate the probability of an improved general acceptance for frozen meats.



*The logs of meat are sliced to wafer thinness on an automatic slicing machine. A stack of these thin slices (approximately six) makes one Chip Steak.*

*Steaks for the retail trade are labeled and then packaged in units of twelve. Chip Steaks have become popular because they are boneless, tender, uniform and easily prepared.*

# New Packages & Products

### *Rabbit Products Marketed*

Rabbit meat with or without bones, rabbit livers and rabbit rice soup, in 8 oz. jars and 10 and 32 oz. cans, are now being packed by Berlin Cannery, Berlin, Conn. Save for the seasonal use of the domestic wild rabbit, rabbit meat as a food and as an ingredient in prepared dishes has been overlooked on the American diet list. Granting acceptance, rabbit meat processing may offer inducements to food manufacturers. Rabbits mature fast and breed often. They convert to meat a larger proportion of feed than other livestock and yield a high percentage of meat per pound of weight. They are clean and inexpensive to feed. They produce excellent fertilizer in abundance. Besides packing for the retail and consumer trade, Berlin Cannery, "custom canners," packs for individual breeders. According to Berlin's "canning plan," healthy and fleshy live rabbits may be shipped to the cannery anytime except July or August, slaughtered, dressed, salted, canned and labeled: "Packed for ———."

### *Canned Meat Loaf*

A new ready prepared dish and time saved in meal planning and preparation are the contributions of "Prudence Beef Loaf", new product of Boston (Mass.) Food Products Co. The canned beef loaf contains beef, pork, cereal and hydrolyzed plant proteins. It is ready to serve in its own gravy after only a few minutes in the oven. It may be served hot or chilled. It may also be served sliced and fried as a breakfast meat dish.

### *Cola-flavored Milk Drink*

One of the most recent products to enter the beverage field is "Milkola", manufactured by The Milkola Co., Milwaukee. This new drink combines the nutritive value of milk with the popularity of cola beverages. Noncarbonated Milkola, in ordinary milk bottles, is to be delivered daily to urban homes, restaurants and soda fountains by milk companies.

### *Coffee Maltose Drink*

New drink bases have been appearing on the market for years. The early ones were made from a chocolate base. Later a variety of coffee concentrates bid for favor. Now comes the new food product of Nestlé's Milk Products, Inc., New York, "Nescafé", a drink base and also a coffee flavoring for cooking. This product is a blend of powdered coffee extract combined with maltose, dextrine and dextrose. The contents of the container is protected by a paperboard lock. The container is closed with an easily opened,

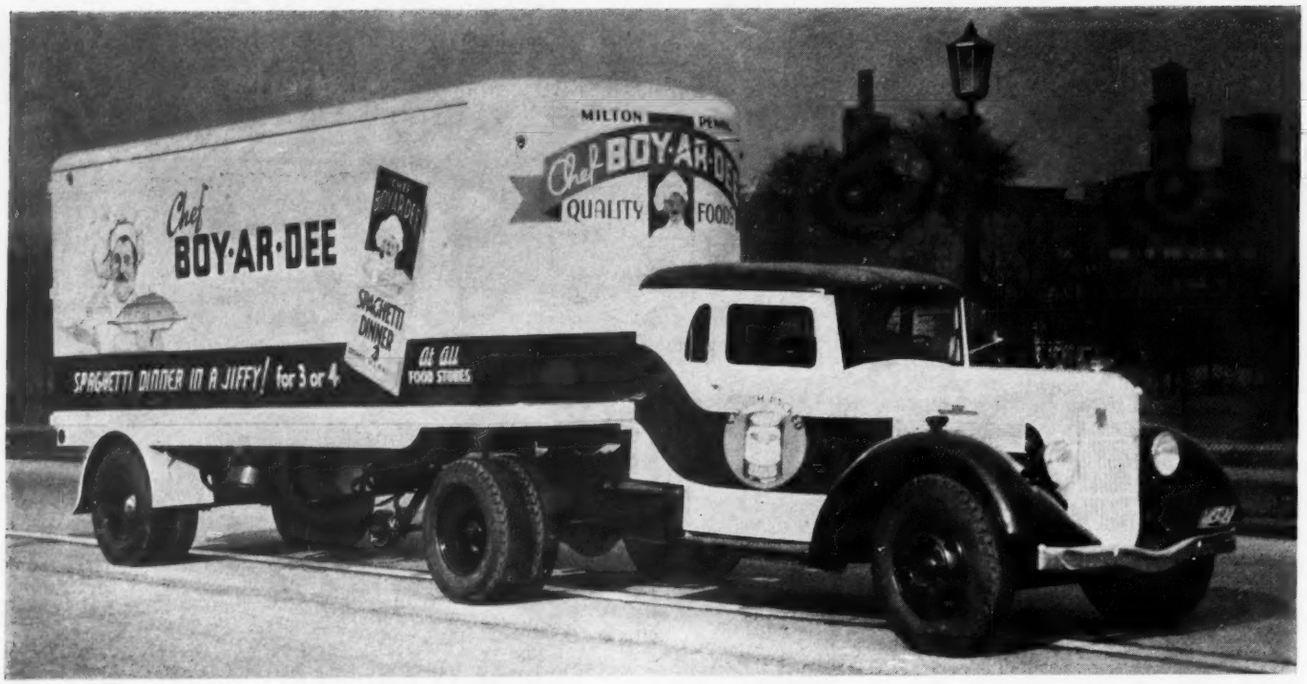
bayonet-type screw top, locked by opposing projections on lid and container.

### *"From Missouri" Made in West*

From the West Coast comes a mid-continent product, "Missouri Hickory Barbecue Sauce", product of Missouri Products Co., Los Angeles. The product is not only a barbecue sauce but an all-purpose condiment to be used in preparing seafood cocktails or for flavoring meats before or after cooking. The glass container, tapering from base to tip, is closed by a screw cap secured by a tamper-proof seal.

### *New Products from Surplus*

Surplus production of a raw food reduces market price and encourages the production of new products from the raw material. Citrus fruits, especially grapefruit, are being produced in increasing quantities each succeeding year, and it is therefore not surprising that new fruit products using citrus fruits as a base should be finding their way to the market, thereby displacing in a measure one or more other food products. Among those recently introduced is "Frutainer" grapefruit sirup, product of Continental Fruit Co., Chicago. This sirup, made of grapefruit and sugar sirup, is for use as a table or cooking sirup or as a sweetner for fresh grapefruit. The sirup is packaged in a glass container with a handle for convenience in pouring.




*Anyone who is fond of spaghetti might well imagine the aroma rising from the huge plate of that food shown on this trailer body owned by the Chef Boy-Ar-Dee Food Products Co. of Milton, Pa. The whole design is tied together, between the chef and his dish at the left and a reproduction of the package in which the spaghetti is sold at the right, by the name of the product in large letters. The wide color band further serves to tie the layout together. The trailer is a Fruehauf.*

# Truck Bodies DRESSED UP To Aid Food Sales

***How its done in the spaghetti, dairy, mayonnaise and dog food industries***

HOW to dress up truck bodies to increase the sales of spaghetti, milk and other dairy products, mayonnaise and dog food is shown in the accompanying illustrations.

When a food company's automotive superintendent and its sales manager get together on the problem of increased sales, it is surprising what a wide variety of effects can be obtained. Those shown herewith, taken in conjunction with similar views for other food products published in FOOD INDUSTRIES for April, 1940, give a wide range from which a selection for any other food product may be made.

Fundamental factors of design common to each layout are the use of some symbol related to the product to be sold; the product itself or the container in which it is packed; and a light colored paint for the truck body background. Then plenty of bright colors—reds, blues, yellows and greens —are needed to attract attention by the vividness of their combinations.

In the tractor-trailer combination shown at the top of this page, white is the basic body color to suggest the cleanliness and purity of the "Chef Boy-Ar-Dee" spaghetti marketed by the Chef Boy-Ar-Dee Food Products Co., Milton, Pa.

Large "spot" subjects to attract attention consist of a chef holding a large plate of spaghetti and a reproduction of the package in which it is sold, both in natural colors. These elements are tied together by the Chef Boy-Ar-Dee name in large letters between the two. A separate layout of the chef's face and the company name on the nose of the trailer above the top of the tractor cab identifies the unit to approaching vehicles.

The wide color band around the sides and front of the trailer body near the bottom tends further to tie the whole layout together. To some, the attempt to carry this band to the tractor, with its necessary drop to get the band on the cab door, may seem to give the tractor a "droopy" appearance.

THE Wilton Farm Dairy truck body layout shown at the top of the opposite page is an out-and-out panorama design. It draws attention by its grazing herd of cows, the brilliant green of the grass, the light blue of the sky, the white of the farm house and the red of the cattle barns.

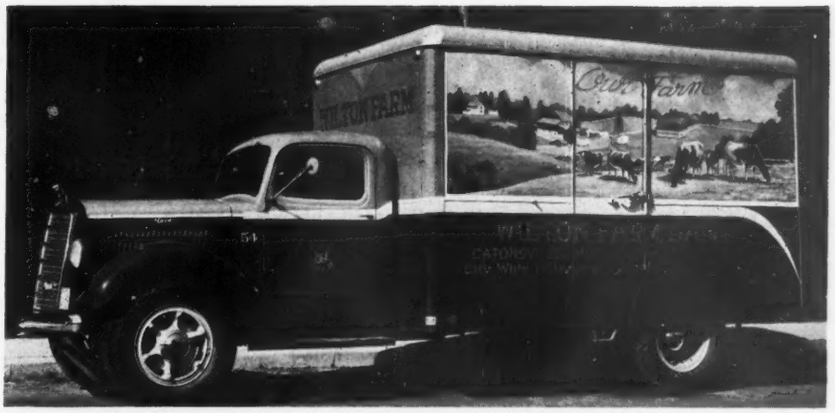
The solid color of the body's lower panel sets off the panorama as in a picture frame. The white body striping below the farm scene is carried forward onto the cab, but not with such a pronounced drop as with the tractor-trailer combination shown opposite.

The C. D. Kenny Co. truck layout for "Spunky" dog and cat food, one of the allied grocery items which it distributes, is a clever adaptation of the before-and-after principle. The two dogs face toward a reproduction of the can in which the food is packed.

Facing the dogs toward the can instead of away from it centers attention on the can and thus ties the layout together. A key selling line is provided at the top of the body just under the edge of the roof. At the bottom, subordinated to the product itself, is the name of the distributor and information as to where the product may be bought.

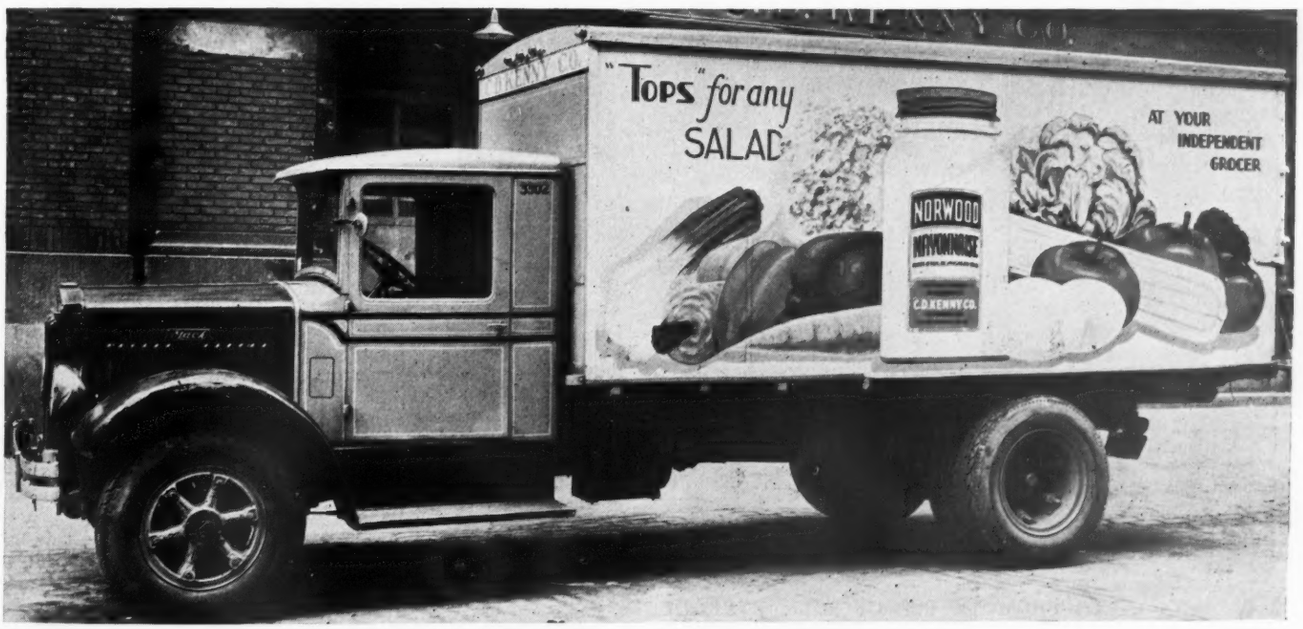
At the bottom of this page is shown an exceptionally attractive display for mayonnaise, this time for the "Norwood" brand as distributed by the C. D. Kennedy Co., Baltimore, Md. Here the main item of the design is a huge bottle of mayonnaise almost 6 ft. high.

It is flanked on both sides by vegetables, with the brilliant red of tomatoes, the vivid green of green peppers, the lighter green of lettuce, the familiar orange-red of carrots and the white color of eggs in the shell, of celery and of scallions.



*A hand-painted farm panorama on this Mack truck serves to advertise the milk and dairy products sold by the Wilton Farm Dairy Co., Catonsville, Md. Bright colors in themselves attract attention, and there are many of them in this panorama, including the green of the grass, the blue of the sky, the white of the farm house and the red of the barns.*

*A clever adaptation of the "before and after" principle is utilized in this dog food layout on an International truck owned by the C. D. Kenny Co., of Baltimore, Md. Facing the sickly and the healthy dogs toward the center focuses attention on the can in which the "Spunky" brand is packed.*




*A huge jar of mayonnaise almost 6 ft. tall features this "Norwood" brand layout on a Mack truck operated by the C. D. Kenny Co. in Baltimore, Md. The layout is a riot of colors. The base body color is white. The transparent glass jar shows the cream color of the mayonnaise. The vegetables flanking the jar on both sides add the brilliant red of tomatoes, the orange-red of carrots, the vivid greens of onions, green peppers and lettuce and the white color of eggs and celery.*

# The Food Industry News



## Distribution Problems Discussed at Meeting

Grocery manufacturers gave complete support to the National Defense program in the one resolution adopted at the annual mid-year conference of Associated Grocery Manufacturers of America in Hot Springs, Va., last month. The manufacturers took this step in the face of the realization that the defense plan points to greater control of industry, possible decline in consumer buying power and other effects which may adversely affect the long-range outlook of the industry.

Discussing distribution problems, Carl Dipman, head of *Progressive Grocer,* New York, said that corporate chains are building up their own brands to a point where they may be able to force grocery manufacturers to seek further economies in production and distribution to meet the lower prices. Mr. Dipman also said that although many small independent retail grocers are going out of business in all parts of the country, the larger markets are retaining their consumer following and in some cases making gains, despite chain and supermarket competition.

The assertion was made at the conference that chains are following unfair selling practices in that they attract customers by using national brand items and then virtually hide these items under the counter.

It was reported that there has been an increase in the sale of private brand merchandise but that few, if any, manufacturers have lost volume in their sales to chains.

## Warns Butter Makers On High Mold Count

In a notice to the butter industry concerning unfit cream and butter, the Food and Drug Administration has emphasized the relationship between mold mycelia in butter and the quality of cream from which such butter is manufactured. Studies have shown that a high mold mycelia count in the finished butter never occurs unless some of the cream was to a material degree filthy, putrid or decomposed. Butter made from such cream is considered to be adulterated within the meaning of the Food, Drug and Cosmetic Act.

It is stated that where good sour cream, produced and handled with reasonable care, is used for churning, the mold mycelia count of the butter will be well under 60 percent. And, according to the Administration, careful manufacturers may, without serious difficulty, produce butter showing mold mycelia counts in the neighborhood of 20 percent.

## Stamps Good for Vegetables

Fresh vegetables, designated by regions, or areas, and for the periods when they are in "seasonal surplus", will be added this summer to the list of commodities which can be obtained with blue surplus stamps where the food stamp plan is in operation. This was announced by the Department of Agriculture on June 7.

As of June 10, the complete list of surplus foods, except for the newly designated surplus vegetables, included: butter, raisins, rice, pork, pork lard, corn meal, shell eggs, dried prunes, fresh oranges, hominy grits, dry edible beans, wheat flour and wholewheat (graham) flour.

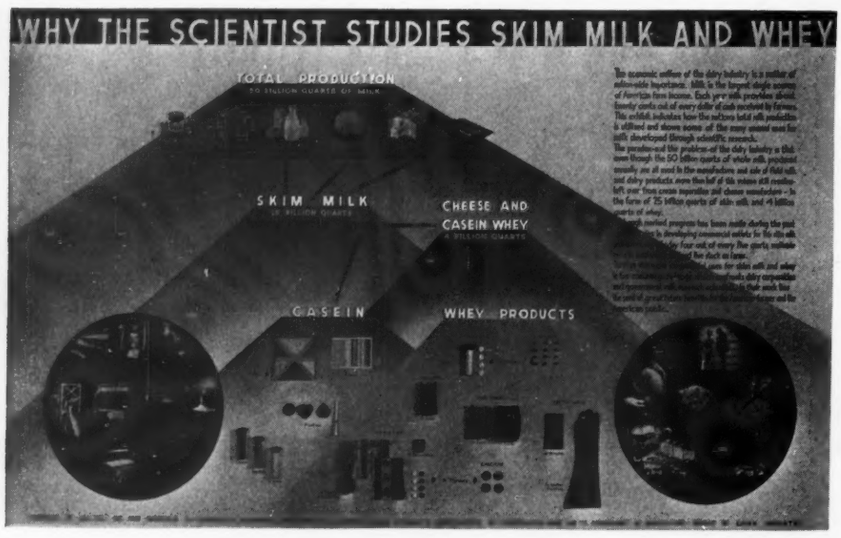
## Candy Makers Receive Advice at Convention

Problems facing management in the confectionery industry were discussed in a four-day convention of National Confectioners Association, in New York, June 3-6. Attendance at the sessions and the exhibit of machinery and supplies totaled 3,500.

As a result of action taken at the meeting, a paid president of NCA will be appointed. It will be his duty to plan a more effective program of activity for the association.

Speaking on "Market Research as a Modern Selling Tool," Willard F. Deveneau, National Folding Box Co., said: "Our great research laboratories have and will continue to usefully serve the needs of their industrial sponsors, but in addition to their chemists and physicists it seems clearly indicated that they must use a newer and perhaps less scientific staff member — one who above everything else can accurately interpret the needs and desires of potential ultimate consumers."

The selection and development of sales personnel was discussed by Morris I. Pickus, Personnel Institute, Inc. Said he: "Ninety percent of the salesmen in America are poor salesmen, and I do not put the entire blame on them. I believe that the major portion of the blame rests on the management. The reason that we have poor salesmen is because we have poor sales managers, and when I say 'poor sales managers' I mean it specifically in the sense of their being poor teachers."



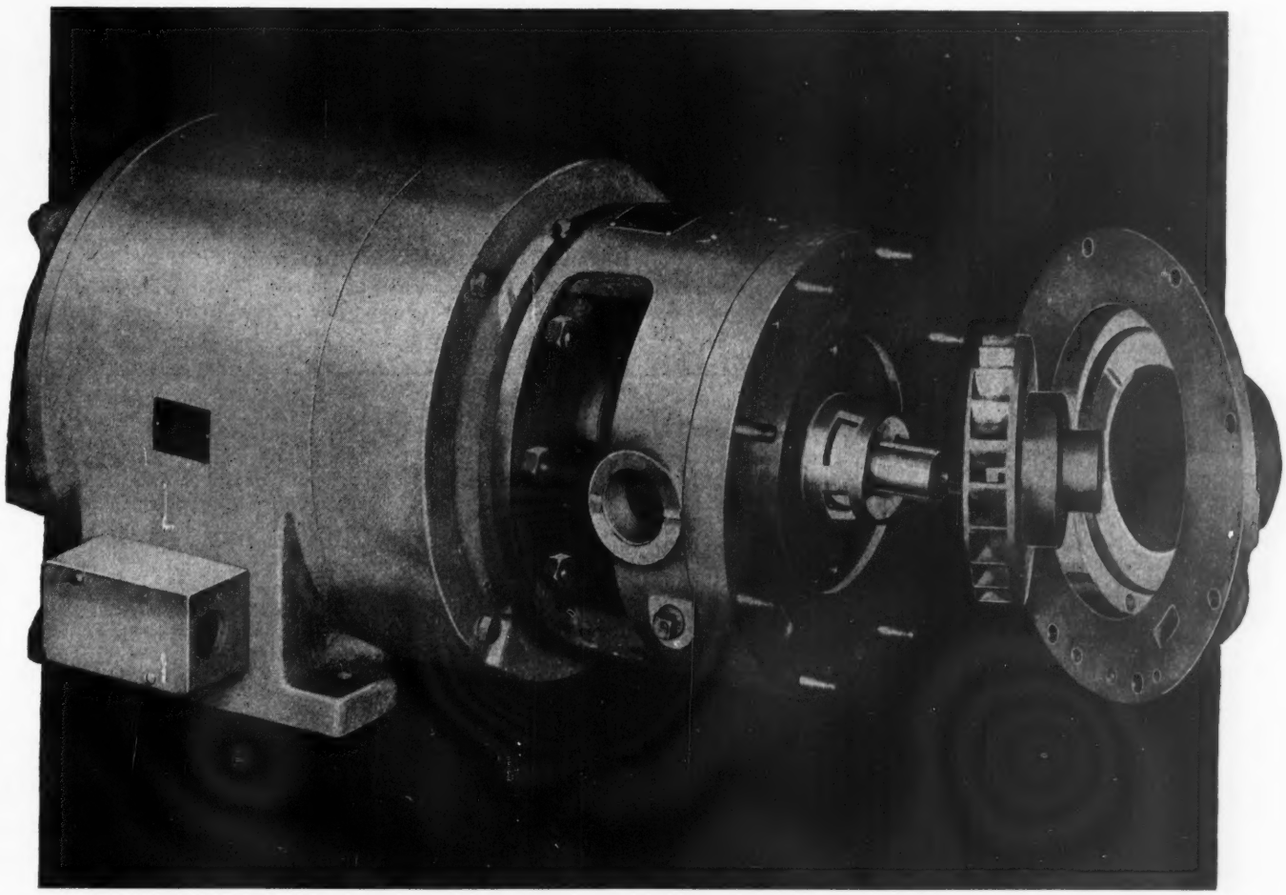

TO PROMOTE USE OF MILK BYPRODUCTS

***This exhibit has been set up at Smithsonian Institution, Washington, D. C. It was prepared by Sealtest, Inc., and Sheffield By-Products Co., divisions of National Dairy Products Corp., in collaboration with the U. S. Bureau of Dairy Industry. Its purpose is to further the use of milk byproducts in industry. The exhibit traces the utilization of the nation's yearly fifty-odd billion quarts of milk production.***

# THE NASH CLEAN-AIR COMPRESSOR

REG. U. S. PAT. OFF.

## *has but one simple moving part.*



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

Air or gas from a Nash Compressor may be used for agitating, blending; maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

**THE NASH ENGINEERING COMPANY**

**220 WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.**

The credit department of a company, by its fair and friendly attitude toward its customers, a sympathetic understanding of their problems, courteous treatment and skill in effecting collections will build up a good will for the company which naturally will be reflected through increased sales. That was a point made by Arthur L. Stang, Cracker Jack Co.

## Operative Millers Meet

The human element in efficient milling of flour is important more than ever before, and "mechanization" is no substitute for the intelligent miller. That was a point made by various speakers at the annual convention of Association of Operative Millers, held in Buffalo, June 3-7, with an attendance of 607. Philip Pillsbury, president of Pillsbury Flour Mills Co., pointed out that the operative miller is the most important link in the milling chain and that there was a very close interdependence of office and mill. George P. Urban, president of George Urban Milling Co., expressed the same thought.

The greater part of the program was given over to the reading of papers on different technical phases of flour milling, followed by discussions.

Walter J. Harding, Yukon Mill & Elevator Co., Yukon, Okla., was elected president of the association. Horace G. Kohler, Fuhrer-Ford Milling Co., Mt. Vernon, Ind., was elected vice-president; Herman H. Trapp, Russell Miller Milling Co., Minneapolis, was re-elected treasurer.

## Food Law Fully Effective

All provisions and regulations under the Federal Food, Drug and Cosmetic Act are now in full effect. The postponement of certain labeling provisions expired June 30.

## Food Standards Progress

As the date of the transfer of the Food and Drug Administration approached, action on standards was hurried. The following data give the picture as of June 19:

Docket No. 16, canned tomatoes, amending the original docket to permit the use of calcium salts, Secretary's order published in the *Federal Register,* June 19; effective date of order, September 17.

Docket No. 7-C, D & E, evaporated milk, sweetened condensed milk and dried skim milk, examiner's findings published in the *Federal Register,* June 4. The entire milk-products docket No. 7 is now awaiting the final order of the Secretary of Agriculture.

Dockets Nos. 18, 19 and 20, amending the canned asparagus and canned cherries standards, examiner's findings published in the *Federal Register,* June 18. These dockets also await the Secretary's order.

Dockets Nos. 10, 11 and 12, fruit jams, jellies and butters, and four kinds of cheese, are the only remaining standards on which action has been initiated and not completed. These dockets are awaiting examiner's findings.

British Combine

**BRITAIN STEPS UP MARGARINE OUTPUT**

***Since the war started, England has increased production of margarine by 50 percent. The plants operate day and night without ceasing. These women are making packing cases in a margarine plant in Essex.***

## Packages Affected by War

The packaging industry is among the first to feel indirectly the war influence, according to George A. Mohlman, vice-president of Package Machinery Co. With pulp and paperboard prices rising because of the war, there is a strong demand for bundling machines. By shipping products in paper bundles instead of cartons, manufacturers have been able to hold down increasing material costs, according to Mr. Mohlman. The package machinery industry has also experienced a sudden increase in foreign inquiries, particularly from Japan, Russia and England.

## Booth Loses Patent Appeal

Failure of the application for a patent to mention flat refrigerating surfaces cost Booth Fisheries Corp. an appeal to the U. S. Circuit Court of Appeals in Washington. The purpose of the appeal was to force Commissioner of Patents Conway P. Coe to reissue Patent 1,614,455 for freezing fish or other foods.

This action was brought in the U. S. District Court in Washington by Booth under a statute permitting "reissues" when any patent is invalid by reason of defective or insufficient specifications, if the error arose by "inadvertance, accident or mistake."

In its suit Booth asked reissue with the addition of claims copied from Patents 1,773,079 and 1,773,081, which had been issued to Clarence Birdseye in 1930, as well as from patents 1,822,121 and 1,822,123 which were issued in 1931 to Barry and to Birdseye and Hall.

The court held that the Birdseye, Barry and Hall patents related to a "very different" concept of freezing from the concept held by Cooke, the former using flat freezing surfaces rather than containers. The Cooke patent is held by the Booth Fisheries Corp.

## Learner Certificates Issued

Three companies in Washington and Oregon have been issued certificates to employee learners in the operation of cherry packing for a learning period not to exceed four weeks at a wage rate not less than 22½ cents per hour. These companies are: F. H. Cubberly Fruit Co., Yakima, Wash.; Apple Growers Association, Hood River, Ore.; Duckwall Bros., Inc., Hood River, Ore. These certificates, announced in the *Federal Register* on June 18, expire in mid-July. The certificates were the result of emergency conditions declared in the State of Washington by the State department of labor.

The employers to whom these certificates have been issued demonstrated that experienced workers for the learner operations were not available, and that learners were actually needed in order to prevent curtailment of opportunities for employment.

## Arkansas Food Rules Conform

There are more ways than one of making the labeling of foods in intrastate commerce conform to the Federal Food, Drug and Cosmetic Act. When Arkansas made certain changes in its food law in 1939, the State law was not brought into conformity with the Federal. However, State regulations have

since been issued which practically adopt the Federal law and its regulations. Thus, among other provisions, ingredient listing becomes a requirement on Arkansas food labels.

## Formula for Using Dextrose

When a canner elects to use sirups made from a mixture of dextrose and sucrose, the mixed sirups shall approximate the sweetness of the corresponding sucrose sirup designated as light, medium, heavy or extra heavy in the food standards. This means that the total weight of the mixed sweetening ingredient in the sirup must be somewhat more than when sucrose alone is used, because dextrose is not as sweet as sucrose. This is according to a ruling issued by the Food and Drug Administration on May 29.

## Lowers Tomato Mold Count

The F&DA announced on June 17 that during the 1940 season action will be taken against tomato catchup, puree and paste if mold filaments are present in more than 40 percent of the microscopic fields and against tomato juice if present in more than 15 percent of the fields.

## Tentative Standards Issued

Tentative United States standards for grades of canned asparagus and for grades of dried apples have been issued by the Agricultural Marketing Service of the U. S. Department of Agriculture. The tentative standards for canned asparagus became effective March 15, 1940, and those for dried apples, January 15, 1940. Those who have not received copies of these standards may obtain them from the Department of Agriculture.

## Swift Improves Lard

Tremendous improvements in lard are made possible by a revolutionary new development announced on June 17 by Swift & Co., Chicago, the company claims. The improvement is effected by the addition of extremely small quantities of gum guaiac, obtained from the sap of the guaiacum tree, which grows in the West Indies and Central America. Addition of this product is said to keep lard fresh when it is exposed to air without refrigeration. And the lard is also credited with being odorless and bland in flavor.

## Consider Lard Definition

Spokesmen for processors, producers and consumers agree that a definition for lard would be beneficial in improving use of the product by housewives. They expressed that belief at an informal conference before Undersecretary of Agriculture, Claude R. Wickard, in Washington, June 18.

The three groups disagreed, however, on the appropriateness of the definition proposed by the Department which would require that lard sold under Federal inspection could be rendered only from "fresh, clean, sound, fatty tissues from hogs in good health at the time of slaughter, with or without lard stearin or hardened lard." Excluded from this classification would be bones, skin, organs, windpipes, large blood vessels, scrap fat, skimmings, settlings, pressings and the like. Lard rendered from other fat would be required to be marketed as "edible rendered hog fat", "pork fat shortening" or something similar.

The Institute of American Meat Packers, represented by George Lewis, took the stand that lard quality could be regulated better by manufacturing processes than by division of quality of raw materials.

## Proposed Trade Cartel Affects Food Industry

President Roosevelt's proposed cartel to carry on foreign trade for the Western Hemisphere in dealings with the rest of the world, particularly Hitler, if it materializes, is expected to become one of America's most powerful weapons to thwart Nazi invasion of the New World.

An "if" in the program at present is whether the South American nations will cooperate. Informed Washington believes they will. Another "if", and a big one, is whether American farm groups and food processors will back the program to pool Western Hemisphere export commodities and put them on the market as a unit.

The functions of the cartel, in the drafting room stage, are these: (1) To buy up exportable quantities of wheat, meats, coffee, fruits, hides, skins, cotton and copper produced by Latin American countries, and perhaps Canada. (2) To sell these goods either in this hemisphere or elsewhere, for cash or by barter. (3) To act as a purchasing agency in Europe and other continents for members of the cartel. (4) To control prices of goods produced in this hemisphere and to drive the best bargains with the dictators. (5) To regulate production of the commodities being handled to protect the cartel's funds.

Official Washington has described the plan as a giant fortified trade wall to defend the New World from what many believe is the most vulnerable point of attack by the dictators—the economic front.

## New Taxes To Be Levied Against Food Industry

All food companies will be affected by the same general tax increases as other business through a special ten percent super tax on corporate incomes, capital stock taxes, excess profit taxes and the other forms of general levies. In addition there will be a number of special levies modifying excise taxes now in force. Beer and wines will bear new burdens of this sort, probably an increase of 20 percent above the rates formerly in force. Floor taxes reflecting the increased excise rates are expected also. Another commodity involved will be oleomargarine, as the excise tax on it and other important commodities will be increased by a blanket 10 percent. However, the excise levy on coconut oil probably will not be increased.

## Issues Olive Industry Rules

Trade practice rules relating to the sale and distribution in commerce of ripe olives by packers, jobbers, distributors, importers or other marketers were issued June 14 by the Federal Trade Commission. The rules are designed to prevent misrepresentation, deceptive concealment, discriminatory prices, rebates and various other unfair trade practices.

# Answers to Food Law Questions

***Interpretative Opinions from F&DA Letters to the Industry***

Labeling continues to be the chief problem involved in the trade correspondence between the Food and Drug Administration and food manufacturers. The following abstracts continue the monthly series which began in the April issue of FOOD INDUSTRIES, page 75.

110. A manufacturer of *coal-tar colors* may dilute a certified dry color at order of interstate customer and submit in name of customer a sample of mixture for certification before bulk shipment of mixture is made.

111. *Tomato paste* diluted with water and containing artificial color may not be a legal product; if it were legal under any labeling, it could only be designated "Imitation Tomato Puree."

112. If *glycerine* is added to *peanut butter* to prevent oil separation, it must be declared on the label.

113. "Interstate commerce," as defined in Sec. 201 (*b*) of the Food, Drug and Cosmetic Act, is broad enough to cover commerce within the United States and between the United States and foreign countries; "import" and "export" are not defined in the Act; Sec. 801 (*d*) refers to countries not subject to the authority of the United States.

114. "Maraschino Cherries" is the common name of a product heretofore regarded (Food Inspection Decision 141, issued in 1912) as not entitled to the unqualified name "Maraschino."

115. Use in *baked goods* of soybean flour containing added *carotene* (vitamin A) is likely to involve adulteration because of the color imparted.

116. The ingredient statement on *individually* wrapped five-cent bakery products may cover ingredients common to all varie-

*Paging . . .*

# MR. E. NORMOUS BAKER

If you believed that Kemp firing 100 percent premixed gas and air would radically improve your oven efficiency, or minimize human attention and human error, or cut fuel bills . . . you'd certainly check into it, wouldn't you?

You can take it from other big fellows in baking (Ward and General, for example) Kemp firing *does all three!*

When heating operations are controlled by the Kemp Industrial Carburetor, heat is *uniform,* flame characteristics are exactly as wanted, flame pressures constant, and fuel consumption lower . . . *from 15 to 50 percent lower!*

Even if you are tempted to think we are talking through our hat, you still ought to make sure. Ask us to send you facts and figures. Address **The C. M. Kemp Manufacturing Co., 405 East Oliver Street, Baltimore, Md.**

**KEMP of BALTIMORE**

ties; a supplementary sticker would be necessary to declare the *characterizing* ingredients in any particular package.

117. *Nitrogen* or *carbon dioxide* in canned foods is not regarded as a chemical preservative and need not be declared on the label.

118. The use of *guaranty* statements on flour labels is discouraged as they are likely to mislead; if used, the sponsorship should be clearly stated.

119. A *guaranty* or undertaking as contemplated by the Act [Sec. 303 (*c*), to furnish a manufacturer protection from criminal prosecution] must be more than a *warranty* between seller and buyer.

120. "Saponin," if used in *beverages* or other food, must be wholesome and not result in adulteration; it must be declared in the ingredient statement.

121. *Marmalades* are regarded in the category of fruit preserves, temporarily exempted (Feb. 15, 1939) from Sec. 403 (*i*) (2), if composition conforms to advisory standard under Food and Drugs Act of 1906.

122. *Caramel* is an artificial *color;* labeling may be "Burnt Sugar Coloring," "Added Caramel Color" or "Colored with Caramel."

123. If no trace of a *fumigant* remains in the finished food it need not be labeled "fumigated"; the use of a highly *toxic* fumigant (methyl bromide) is viewed with apprehension.

124. Mandatory *label* information on a round can should appear on the main display panel; the use of an intermediate panel, having a width of at least 20 percent of the total width of the label and for the exclusive use of the mandatory label information, is an alternate plan; detailed label requirements of food *standards* may modify this alternate plan; in the case of a square package, as distinguished from a round can, mandatory information should appear on the display panel or panels of the label.

125. *Importers* who are also their own distributors may label articles "Imported by .....," without further qualifying by the word "distributor."

126. Use of liquid packing media for canned peaches, pears or apricots, for which *standards* have been established, is restricted to those listed in the standards; the expressed and strained liquid from canning byproducts, mixed with a sugar sirup to meet sirup density requirement of the standards, is not listed as a packing medium and would violate the standards; amendment of the promulgated standards is provided for by the law, however.

127. *Potato chips* and sticks need not name specifically the oil in which fried; the terms "vegetable oil" or "vegetable shortening" may be used, in fact.

128. Name of fish from which eggs are taken should be part of name of *caviar,* if other than sturgeon; although canned fish roe have been temporarily exempted from label declaration of ingredients, this does not exempt declaration of any *unusual* ingredient.

129. Label vignettes may be misleading if they show articles not present in container, unless clearly and only implying *uses* for contents.

130. *Mayonnaise* and *chili sauce* when used as ingredients of *salad dressings* may be listed by common name; *cereal starches* in salad dressings should be individually named.

131. The use of *sodium nitrite* brine for preserving *fish* fillets is questioned on three points: (*a*) deleterious ingredients? (*b*) chemical preservative? (*c*) inferiority concealment?

132. *Fish* shipped by fishermen to wholesale markets in large boxes or barrels are not considered in package form, but *containers* should bear name of fish.

133. The designation "Beverage Base" is appropriate on an article to be mixed with sugar and water to produce beverage; the fact that sugar must be added should be plainly stated.

134. *Mincemeat* ingredient statement should include "water" if not all removed

during manufacture; *pie* label may declare "mincemeat" as common name of ingredient if of normal composition.

135. *Potatoes* in sacks are food in package form and must bear the mandatory label information.

136. Use of *pumpkin* to impart yellow color to baked goods or other food, simulating egg content, would constitute adulteration not correctable by any form of labeling.

137. (Amplifying abstract No. 101)—*Flavoring* compounds containing certified coal-tar colors do not require certification.

138. *Natural* fruit flavors *fortified* with essential oils and plant extractives should be labeled, for example, "Strawberry Flavor, Reinforced with Natural Flavors," and ingredients should be listed.

139. Experience has shown that strengths of put-in sirups in F&DA *canned fruit* standards conform to cut-out sirups specified in AMS canned fruit grades.

140. *Pectin* preparations should be labeled to show ingredients and jellying strength of mixture.

141. Beer and other *alcoholic beverages*, though subject to the Food, Drug and Cosmetic Act, will be controlled by the Federal Alcohol Administration to avoid duplication of effort.

142. "Malt syrup" unqualified means barley malt sirup; if other cereals are included, they should be named.

143. Box-end labels on crates of fresh fruits and vegetables should include a statement of quantity of contents.

144. Canned *prunes* should be labeled fresh or dried, as appropriate.

145. *Pretzels* in 6 or 10 lb. cans are food in package form; pretzels should declare a trace of sodium carbonate, rather than caustic lye, as an ingredient.

146. *Monosodium glutamate* is considered an artificial flavor; it may not be used to conceal damage or inferiority, however.

147. Mixture of *mustard* and mustard bran to which artificial mustard oil or cayenne pepper is added should be labeled "Imitation Prepared Mustard."

148. Quantity of contents statement on *pickle* label may be weight or liquid measure or numerical count of drained product, in accordance with usual trade practice for the particular article; pickles in gallon cans for sale to manufacturers of other products are food in package form.

149. *Canned peaches* containing no added packing medium may be designated by the common name "Solid Pack Peaches."

150. *Process cheese* made from normally colored cheddar cheese need not declare artificial color, pending promulgation of identity standard.

151. Labeling of *confectionery* containing not more than 0.4 percent of harmless nonnutritive glazes may include "shellac glaze" or "resinous glaze"; *carnauba wax* is not a proper ingredient of confectionery; addition of edible *stearic acid* is subject only to the general provisions of the Act.

## SCHEDULE OF EVENTS

### JULY

8–10—Oyster Growers and Dealers Association of North America, New Haven, Conn.
9–11—National Confectionery Salesmen's Association of America, Boston.
15–17—Annual Summer Conference of the Dairy Council, Edgewater Beach Hotel, Chicago.
24–27—Southern Wholesale Confectioners Association, Inc., Hotel Roanoke, Roanoke, Va.

### AUGUST

6—Association of American Importers of Green Olives, Hotel Pennsylvania, New York.
13–16—International Apple Association, Hotel William Penn, Pittsburgh.
21–24—National Food Distributors Association, Sherman Hotel, Chicago.
27–30—National Health Foods Association, Drake Hotel, Chicago.
29—American Cranberry Growers Association, semi-annual meeting, Pemberton, N. J.


# Reduce Costs 3 ways at once

## MACHINE BUNDLING DOES IT

If you operate cartoning or wrapping machines, the chances are that your volume is sufficiently large for you to benefit by the three striking savings that machine bundling offers.

From the day you install this machine:

**DOWN GO PACKING MATERIAL COSTS**—Using a strong, heavy paper for bundling instead of costly made-to-order boxes, makes an immediate saving of 60%—particularly important in view of the large increase in pulp prices.

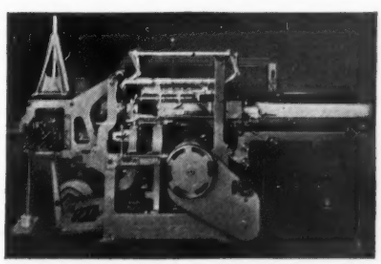
**DOWN GO SHIPPING COSTS**—Paper weighs one-third as much as cardboard containers. The saving in shipping costs is really a double one as containers must be shipped from box factory to your plant, and thence to your distributors.

**DOWN GO LABOR COSTS**—The bundling machine requires only one or two operators to do the work of many hand packers. It will handle the output of one or more cartoning machines.

Moreover, machine bundling also saves the floor space formerly required for packing and storing bulky boxes.

Send us a number of your packages, and we will return them to you bundled on our machine, along with figures on machine bundling costs to compare with your present costs.

*Write for complete information*

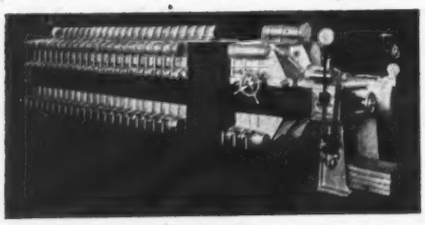


Automatic feed conveyor transports packages directly from cartoning machine to bundling machine, which wraps them in lots of from 2 to 24, depending on the size of the packages. Packages may be assembled in various ways to suit the shape of the bundle desired. Plain or printed wrappers may be used, and the machine also attaches end seals.

**PACKAGE MACHINERY COMPANY, Springfield, Massachusetts**
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
Buenos Aires, Argentina: David H. Orton, Maipu 231
Mexico, D. F: Agencia Comercial Anahuac, Apartado 2303
Peterborough, England: Baker Perkins, Ltd. Melbourne, Australia: Baker Perkins, Pty., Ltd.

**PACKAGE MACHINERY COMPANY**
Over a Quarter Billion Packages per day are wrapped on our Machines

A Big Baby for MASH!



A Tiny Tot for Vitamins!



**SHRIVER FILTER**

**There's a world of difference in type, size and capacity between a 3,400 gallon filter for recovering wort from brewery mash and a simple little unit for vitamin solutions. Yet both liquids come out of Shriver Filters sparkling clear, right up to desired standard.**

**Any type, any size, in any metal, wood or rubber; that sums up the flexibility of Shriver Filter application for food filtration.**

**Whether it's clarification, bleaching or decolorizing syrups, vinegar, cider, distilled liquors, wines, oils, pectin or whey, the recovery of yeast cake, or recovery of by-products that might otherwise go to waste—you'll find Shriver Filters the right ticket to better processing.**

***LET OUR LABORATORY***

**determine what better filtration can do for your product; send us a sample; we'll investigate the filtration rate, capacity and method to meet your requirements and give you our unbiassed recommendation. No obligation, of course.**

**T. SHRIVER & COMPANY**

**860 Hamilton St. Harrison, N. J.**

***Western Agent*—The Merrill Co.**
**343 Sansome St. San Francisco, Calif.**

**FOR BETTER QUALITY**
**Shriver FILTERS**
**RECOVER SOLIDS · CLARIFY · DECOLORIZE**

# CAPITAL VIEWS

**FOOD FOR DEFENSE**—Abundant food reserves insure that no one need go hungry in the United States even if this country should be confronted with serious military responsibilities. The planning of Defense Commission advisers to the President is, therefore, intended to insure proper distribution and safeguard against runaway prices. Unless the European continental "famine", glibly forecast for 1941 or 1942, should materialize, there need be no duplication of the World War effort to stimulate American food production. The food industries will, however, have some new responsibilities and some operating difficulties. The latter will probably originate in shortage of skilled mechanics and possibly some difficulty in buying new machinery.

**FOOD FOR EUROPEAN RELIEF**—Officials in Washington with good memories are cautioning against either of two mistakes that might be made in shipping food to Europe for relief of destitute civilian populations. From World War days they recall how tin cans went over full of food, and probably reached proper destinations; but the cans came back from German fighting lines full of incendiary material or as hand grenades. This leads to the warning that *canned* foods should not be promiscuously dispatched abroad, both to save the tin, of which Uncle Sam is very much in need, and to avoid this second-hand can usage. The other precaution suggests that food sent to civilians may become a direct aid to the Reich. It is a difficult matter, officials find, to aid civilians who are now looking to the German government for any food that they get without actually augmenting the fat and oil and other supplies of the aggressor nations. Generosity for civilian relief must, therefore, be tempered by prudence.

**F&DA MOVES**—The transfer of Food and Drug Administration to the direction of Federal Security Agency was fixed by Congressional action to take effect June 30. Thus this group starts its new fiscal year, July 1, with Mr. Paul V. McNutt in charge, with all of the authority which formerly rested with the Secretary of Agriculture. Using this authority, Mr. McNutt is expected to announce promptly the schedule for a number of food standards hearings. These will then go forward in the general fashion as hitherto, probably for flour, vitamin fortified or dietary foods, and a number of other important foods which are now under temporary exemptions from label declaration of their ingredients.

**STANDARD PACKAGE SIZES**—The State weights and measures officials who held their annual conference under the auspices of the National Bureau of Standards during June again went on record as urging that a very limited number of standard size packages be required for staple foods. This group is continuing to press the proposal that canned goods, for example, should be packaged only in containers which are simple multiples or submultiples of the pint. They are not appeased by the elaborate and remarkably successful program which the National Canners Association has already established. Their effort may not soon get anywhere with legislation, probably will not during an emergency period like this; but it remains a rather radical pro-consumer activity to be reckoned with some day.

**NEW BEVERAGE TAXES**—Beverages are luxuries. On this philosophy, whether right or wrong, Congress is proceeding to levy new taxes that will bother several food groups. The desire to up rates on alcoholic beverages will materially affect costs to the consumer of those products. The Senate initiated in mid-June the threat of a new tax on carbonated beverages, and there is quiet talk in the lobbies about "Why not tax coffee a couple of cents a pound?" Cynics say "Even ice water is not cheap any more."

**WAR PRIORITIES**—It will probably be some time before food is affected by any priority activity in emergency preparation. No formal government rulings are expected even for such things as airplanes, tanks, guns and so forth in the immediate future. The Defense Commission members feel that voluntary cooperation will suffice to get most important things done first. When priority schedules come, if ever, food will be far down the list as compared with other commodities, because of obvious surpluses. High preference will be granted only in matters of transportation when actual food shortages may threaten locally, if one can judge from World War experience.

**"SEASONAL" INDUSTRY**—A few agricultural food activities are certainly seasonal within the meaning of the Wage-Hour Law. But many manufacturers who have important seasons of peak activity are definitely ruled out from the exemptions of the law by recent findings. In effect, the Administrator says that if an industry operates throughout the year it will not be given exemption from the 42-hour week requirement even though it has a very important seasonal peak. It remains to be seen whether the extra workers who are hired for this peak period can in any way be segregated so that they may not impose time-and-a-half wage rates on the employer beyond the 42-hour limit during the few weeks that they work.

If a single company has several seasonal peaks in succession, one for peas, one for tomatoes, one for some other vegetable that it cans, the fact that the sum of the three peak seasons exceeds 14 weeks practically denies all seasonal classification for the separate parts of the activity when the separate parts of the work are done at a single factory. If they be carried out in entirely separate establishments, then each establishment is separately treated and may be called "seasonal" unless the employees move from one work place to another.

The executives of the Labor Department dealing with this matter are undertaking to make seasonal exemptions a negligible factor in the food business—and under present circumstances seem likely to succeed.

## FSCC Boosts Buying Of Surplus Products

Federal Surplus Commodities Corp. stepped up its buying last month, chiefly in lard and pork products. But its program for the immediate future is in a state of flux caused by the war and the increasing possibility that it may divert some of its foodstuffs to export trade for war refugees.

June lard and pork products purchases totaled 72,556,160 lbs, nearly 40 percent of the total purchases in this line since these commodities were declared in surplus last December. The purchases were made, FSCC announced, to assist corn and hog producers in improving marketing conditions.

Pork products purchases are certain to continue to be heavy for some time, but the FSCC's program is not so certain. If the $50,000,000 war relief appropriation is not turned over to the Red Cross, and indications when this was written were that it would not be, the money will be spent through FSCC. France's capitulation, however, may curtail the American war relief program, so as not to ease Hitler's burden.

Until this is cleared up, the FSCC has no plans for buying for export. Its domestic program, including both surplus crop distribution and the stamp plan, are to be continued and, if possible, expanded. The original appropriation for FSCC for the fiscal year beginning July 1, 1940, was $185,000,000 a reduction of $20,000,000 from the 1939–1940 fund. A supplemental allocation of $100,000,000 has been proposed in Congress. Whether or not this additional sum is approved, FSCC may soon have to begin dividing its purchases between domestic and foreign needy. This, however, probably will affect the corporation's activities as a buyer only by increasing them.

## More Dairy Products

Milk production in May of this year showed more than the usual seasonal increase, according to the June 12 report of the Crop Reporting Board. On June 1 milk production recorded a new high record for that date, both on a total daily and an average per capita basis. Butter production also advanced sharply at the same time, as did production of some other manufactured dairy products. This indicated that comparatively low stocks of manufactured products were resulting in absorption of the relatively high quantities of surplus fluid milk by dairy products manufacturers.

## Good Crop Yields Likely

In spite of somewhat smaller acreages planted to many crops and plantings delays caused by the weather, 1940 yields of principal food crops were forecast at average or above in the June 10 report of the Crop Reporting Board.


# GET ALL THREE *in Metso Cleaners*

**1** **WASHING** and scrubbing in less time is #1 reason why Metso Cleaners click in busy food plants. Metso dissolves quickly in water, and on first contact starts working on grease and dirt. Metso leaves a water film on the cleaned surface and not a grease film.

**2** Point #2: Metso is more restrained in its action on sensitive metals such as aluminum. Metso puts pep into your cleaning but its alkali content is scientifically balanced with silica so that corrosive effect is greatly controlled.

**3** Point #3: Metso saves money, because it's low in cost, priced as basic alkalis. Ask for information and quotations on METSO for your plant.

*Metso Cleaners (Sodium Metasilicate & Sodium Sesquisilicate) originated and developed by*

ESTABLISHED 1831

**PHILADELPHIA QUARTZ COMPANY**

General Offices: 125 S. Third St., Philadelphia. Chicago Sales Office: 205 W. Wacker Dr. Stocks in 60 cities. Sold in Canada by National Silicates Ltd., Toronto.

**METSO CLEANERS**

# "Information, Please"

**We don't know *all* the answers but, considering that our experience in designing and building process machinery goes back 40 years, it stands to reason that we can show you how to do it faster, better, cheaper . . . For information on the equipment that gets things done for less money just check and mail the coupon below.**

**ROBINSON MANUFACTURING COMPANY**

**71 PAINTER STREET, MUNCY, PA.**

**Kindly send particulars on your equipment**

**for** ..... **(process)** .....**(material)**

**Name** .....

**Firm** .....

**Address** .....

DARNELL CASTERS & E-Z ROLL WHEELS

KEEP TURNING AND EARNING

Reduce floor and equipment wear to a minimum — increase employe efficiency with the casters that "always swivel and roll."

Ask for Darnell Manual.

DARNELL CORPORATION, LTD.
STATION B, LONG BEACH, CALIF.
24 E. 22ND, NEW YORK
36 N. CLINTON, CHICAGO

Wheat production was forecast at a total of 727,858,000 bu., made up of 488,858,000 bu. of winter wheat and 239,000,000 bu. of spring wheat. The carryover from the 1939 crop was expected to be 288,000,000 bu. on July 1, making a total of 1940–41 supply of around one billion bushels.

Corn production prospects were reported as favorable. Oats crop was expected to about equal the ten-year average of 1,024,852,000 bu. Rye yield was forecast at 38,640,000 bu., just above the ten-year average. Barley output of 302,000,000 bu. was in prospect, up 34 percent above the ten-year average. A normal pear crop and a smaller-than average peach crop were the principal forecasts among the important fruits.

## Hog Slaughter Up But Prices Lower

Figures for Federally inspected slaughter of hogs in May, 1940, were the highest for the month in some years, with a total of 3,890,182 animals compared to 3,415,761 a year ago and only 2,584,723 in May, 1938.

Coincident with this increase in pork supply, prospects for export markets for pork were decreased by developments in the European war. Naturally, the price of hogs declined. The average price in Chicago on May 4 was $5.98, while on June 1 it had fallen to $5.26, and by June 10 the average was $5.10.

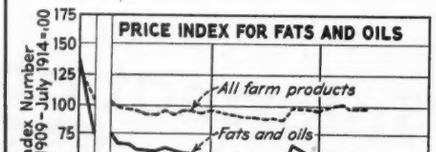
As hogs are at a high point in their numerical cycle, the prospects are for ample supplies of pork at low prices for some months to come. This price and supply situation will, of course, affect the prices of competitive protein and fat foods.

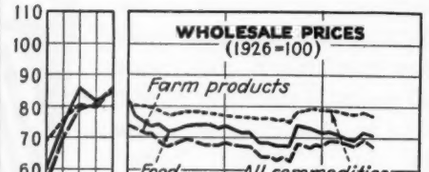
### Data for the Charts

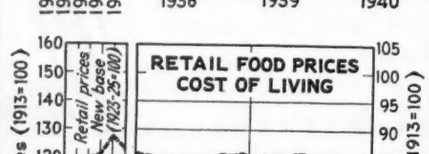
In preparing the curves shown on this and the succeeding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

## Commodity Prices Lower

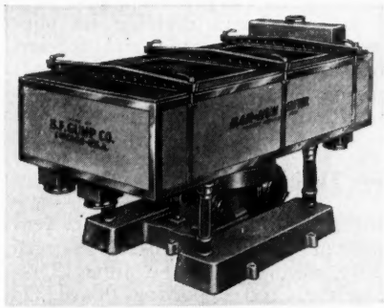
Rapid changes in the European war picture have had considerable reflection in prices for food commodities, as well as upon other commodity prices. The




BAR-NUN "Rotary" SIFTER



The Bar-Nun "full Rotary Motion" Sifter has definitely demonstrated its ability to do a thorough and efficient job of sifting, scalping, separating or grading flaked, granular or pulverized materials. Made in sizes with cloth areas ranging from 4 to 60 square feet; and for single or multiple separations. Investigate the advantages of these sturdy, efficient sifters. Submit samples for proper recommendation.

B. F. Gump Co
Established 1872
454 S. CLINTON ST., CHICAGO, ILL.

## Construction News

| | Pending (thousands) | Awarded June (thousands) | Total Awarded 1940 (thousands) |
|---|---|---|---|
| Bakery | $2,250 | $352 | $1,667 |
| Beverages | 530 | 362 | 4,131 |
| Canning and Preserving | 85 | 123 | 123 |
| Cold Storage Plants | 40 | 40 | 505 |
| Confectionery | ..... | ..... | 475 |
| Grain Mill Products | 90 | 80 | 1,155 |
| Ice Manufactured | ..... | ..... | 151 |
| Meats and Meat Products | 40 | 694 | 1,290 |
| Milk Products | 870 | 100 | 959 |
| Miscellaneous | 760 | 121 | 3,151 |
| | $4,665 | $1,872 | $13,607 |

*New York Journal of Commerce* weekly index of all commodity prices fell from 81.3 on May 11 to 78.8 on June 15. This publication's index for grain prices fell from 82.2 to 66.3 in the same period, while the index for food prices fell from 69.3 to 67.1.

Spot prices of individual food commodities naturally showed considerable change. Wheat, No. 2 dark winter, fell from 83½¢ to 77¢ between May 15 and June 15. In the same month flour decreased from $5.30 to $4.85. Corn was approximately unchanged over the period. Beef increased from 15¢ to 15½¢. Pork loins fell from 14½¢ to 12¢. Eggs dropped from 17¼¢ to 16½¢. Butter decreased from 28¢ to 26¾¢. Sugar fell from $2.85 to $2.77. Coffee was unchanged, while cocoa decreased from $5.72 to $4.81 during the month.

# INDICATORS

BUTTER, creamery, produced in April, 1940, was reported by the Agricultural Marketing Service at 147,745,000 lb., 8.1 percent over March, 1940, production and 2.9 percent above the 143,615,000 lb. produced in April, 1939.

CHEESE, American, produced in April, 1940, totaled 47,620,000 lb., 15 percent above production in the corresponding month a year before.

CONFECTIONERY and competitive chocolate products sales in April, 1940, were $18,017,000 for the 232 firms reporting to the U. S. Department of Commerce, up 5.7 percent over April, 1939, sales.

FLOUR PRODUCTION in May, 1940, as reported by *The Northwestern Miller* for mills representing 64 percent of total U. S. flour production, was 5,488,827 bbl., compared to 5,631,832 bbl. in May, 1939.

SUGAR DELIVERIES for domestic consumption in the United States for the first four months of 1940 were 1,854,417 short tons, 7.4 percent below the same period of 1939, according to the U. S. Department of Agriculture.

EVAPORATED MILK produced in April, 1940, was 225,077,000 lb., 13 percent more than in April, 1939, and 26 percent greater than the 1934–1938 average for April.

OLEOMARGARINE SALES in April, 1940, as indicated by sales of Internal Revenue tax stamps, were 25,788,330 lb., 9 percent above last year's figure.

SALMON canned in Alaska in 1939 is finally reported by the Census of Manufactures as totalling 5,049,989 cases, a decrease of 25.8 percent below 1938 output.

FROZEN fishery products in storage on May 5 totaled 33,626,944 lb., 3 percent under the April 15 figure and 5 percent below the figure of May 15, 1939.

COFFEE CONSUMPTION in the United States during the first four months of 1940 was reported by the Department of Commerce at 682,385,000 lb. This is a record figure for a four-months period and is 20,045,000 lb. greater than consumption in the same four months of 1939.

CHERRY PRODUCTION this year is expected to be 6 percent below the record production of 1939, but 35 percent above the 1929–1938 average for the crop.

CORN ground by corn products producers in May, 1940, was 6,523,729 bu. compared to 5,718,443 bu. in May, 1939.

FRUITS, frozen, in storage on June 1, 1940, totaled 81,864,000 lb., compared to 83,690,000 lb. a year before and to an average of 64,744,000 lb. on June 1 in the years 1935–1939.

VEGETABLES, frozen, in storage on June 1 of this year were 46,345,000 lb., compared to 47,575,000 lb. a year earlier.

BUTTER, creamery, in storage on June 1 of this year was 25,359,000 lb., compared to 84,437,000 lb. on June 1, 1939, and to a 1935–1939 June 1 average of 43,372,000 lb.

CHEESE, all kinds, in storage on June 1, 1940, amounted to 87,393,000 lb., compared to 79,272,000 lb. a year previous, and to an average of 76,598,000 lb. for the date in 1935–1939.

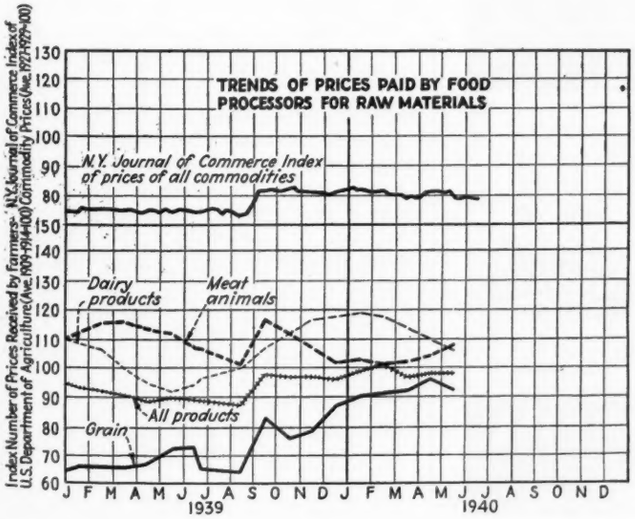
EGGS, case equivalent, in storage on June 1 of this year were 9,506,000 cases, compared to 9,249,000 cases on June 1, 1939, and to an average on June 1 in 1935–1939 of 9,274,000 cases.

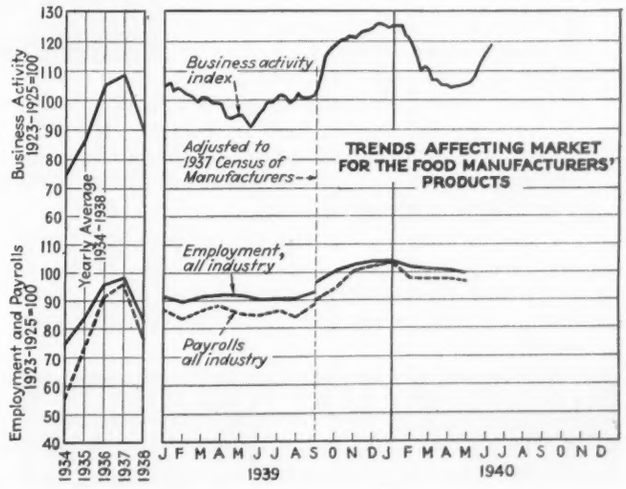
POULTRY, frozen, all kinds, in storage on June 1, 1940, amounted to 76,935,000 lb. The figure a year before was 66,796,000 lb. and the average for the date was 58,278,000 lb. in 1935–1939.

MEAT, all kinds, in cure and storage on June 1 of this year was 726,120,000 lb., compared to 621,828,000 lb. a year earlier and to a 636,458,000 lb. average for the date in 1935–1939.

LARD in storage June 1 of this year totaled 283,844,000 lb., compared to 139,336,000 lb. on June 1, 1939, and to an average of 129,407,000 lb. for June 1 in 1935–1939.

WEEKLY WHOLESALE FOOD PRICE INDEX of Dun & Bradstreet stood at $2.19 on June 11, the lowest figure since August 29, 1939, and comparing to $2.27 on May 14, 1940, and $2.19 for the corresponding June week of 1939.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers, N.Y. Journal of Commerce Index of U.S. Department of Agriculture (Ave. 1909-1914=100) Commodity Prices (Ave. 1927-29=100)
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940


Business activity index
Adjusted to 1937 Census of Manufacturers
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Employment, all industry
Payrolls all industry
Business Activity 1923-1925=100
Yearly Average 1934-1938
Employment and Payrolls 1923-1925=100
1934 1935 1936 1937 1938
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940

## Artificially Ripened Fruit

*(Continued from page 50)*

The discovery and use of kerosene stoves with accompanying mysterious effect in enhancing the color of citrus fruits. (2) The discovery that the mysterious effect was due to production of ethylene by incomplete combustion of the kerosene and the substitution of pure ethylene from easily handled and controlled cylinders of the compressed gas. (3) The observation that ripening fruit hastened the ripening of green fruit. And later, the discovery that ripening fruit produced a substance that effected the sprouting of potatoes and the epinastic curvature of plant petioles such as that brought about by ethylene. (4) The detection and actual identification of ethylene, by chemical methods, as a product normally produced by ripening fruits and almost all kinds of plant tissue at some stage of its life. Thus is demonstrated the solution of a problem through research where step by step the evidence is accumulated through the endeavors of many individuals.

*Part II, concluding this article, will be published in the August issue.* —THE EDITORS.

## Satisfactory Bacteriological Quality

*(Continued from page 46)*

illustrated in widespread experiences with so-called Grade A low-count milk. The new medium, if used for making a total count on cultured milk or soured cream, would give erroneous values unless the types of bacteria are considered. A preponderance of lactic bacteria would be desirable yet appreciable numbers of proteolytic or alkali-formers would undoubtedly give valuable information regarding the general quality and possibly even anticipate the development of quality defects in a variety of food products. Then too, it seems hazardous and perhaps a bit dangerous to rely on one bacteriological method only.

The tendency to strive for lower and lower plate counts as the ultimate objective is not in the interest of substantial quality improvement. Actually there is danger in accepting low bacterial counts as a reliable index of the quality of all food products. In fact it is but another manifestation of going to an extreme in the apparent interest of more quickly gaining an objective. Rather is there need for qualitative methods that will either anticipate or indicate the cause for quality defects. To plead for the plate count in the interests of economy is no argument in its favor, for the new standard agar does possess some potentialities as a qualitative method. Also the proposal to discontinue the publication of plate counts evades the issue and fails to correct an inadequate procedure.

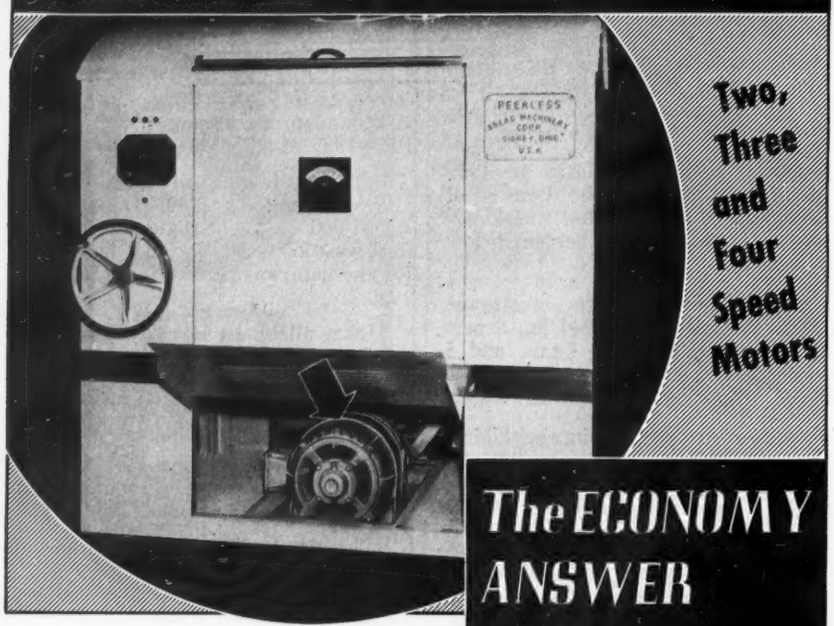
A new conception of official obligations is developing in the field of public health. The regulatory official is beginning to realize that his is not a police duty only, but must also embody the function of education. It is the responsibility of the health authorities, as well as of the food industries, to insure quality as well as safety. Therefore, in applying the essential tests let no one be deceived, for the final judgment of quality will be made not by the expert but by the consumer.

### References


1. *Journal of Milk Technology* **2**, 222, 1939
2. *Journal of Milk Technology* **3**, 103, 1940
3. *Proc. Wisconsin Dairy Manufacturers' Conference* **3**, 7, 1940
4. *Journal of Milk Technology* **2**, 300, 1939
5. *Journal of Milk Technology* **2**, 175, 1939



HOWELL *Multi-Speeds*




Two, Three and Four Speed Motors

*HOWELL Two-Speed, Constant Torque Motor driving dough mixer. Low speed used during first few minutes of operation to thoroughly mix ingredients while in liquid state. High speed used to completely develop dough after it has reached mass stage. Speed changes accomplished by push button control. (Photo courtesy of Peerless Bread Machy. Corp., Sidney, Ohio.)*

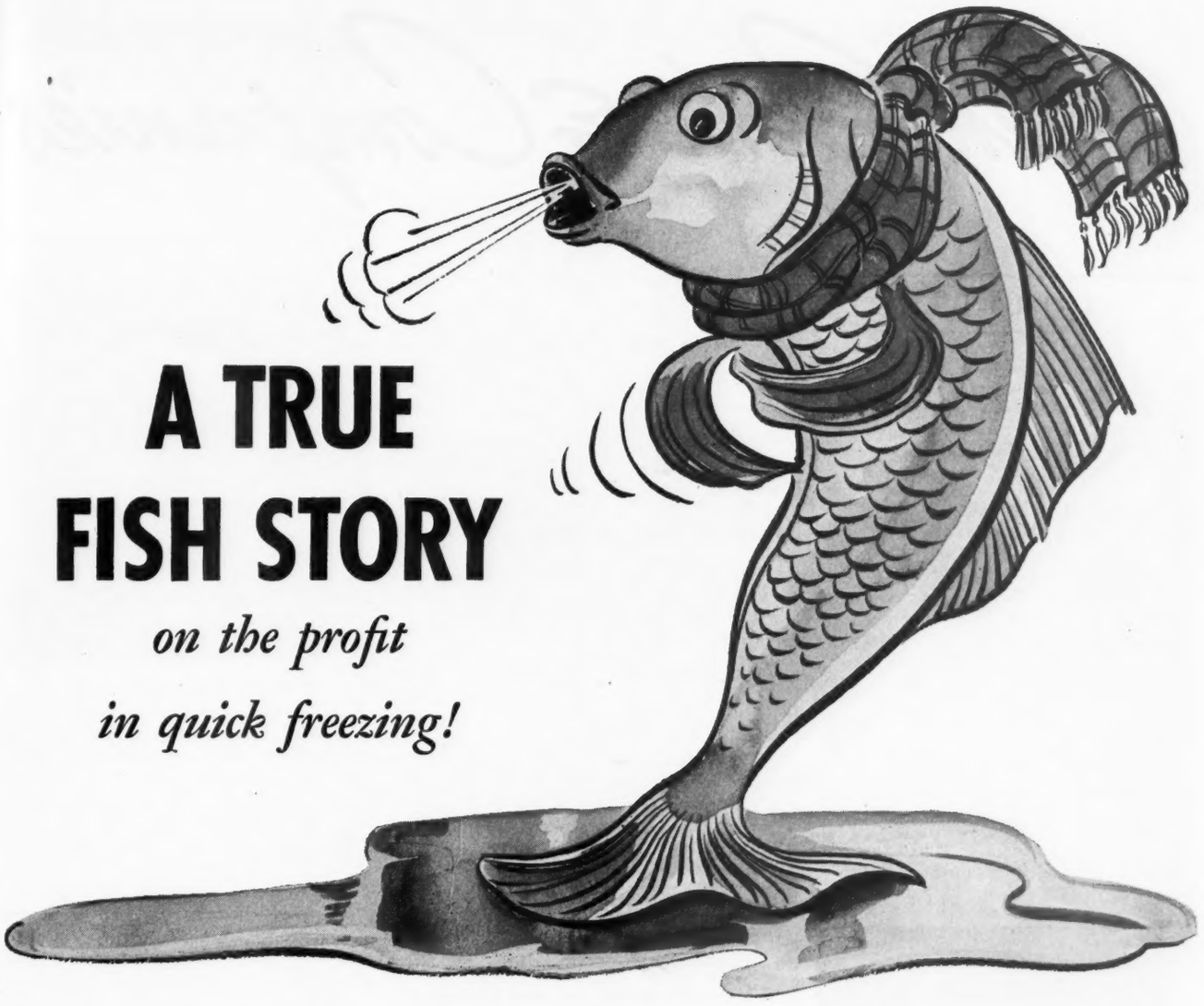
The ECONOMY ANSWER to MOST Multiple Speed Drives . . .

A PIONEER in multi-speed motor development, HOWELL has a wealth of experience from which you can profit. Whenever more than one operating speed is necessary, it will pay you to consult with us because: ***HOWELL Multi-Speed Motors are of far more simple construction, as compared to slip-ring motors — THUS LOWER FIRST COST — and, of course, lower maintenance!***

They are built ½ to 150 HP, as Standard Open Type Motors, or Splash-Proof, and Totally-Enclosed, Fan-Cooled Motors which give full protection against damage by moisture or dust. Write us, outlining your problem!

1915 · 1940 HOWELL RED BAND MOTORS 25th Anniversary Year

HOWELL ELECTRIC MOTORS COMPANY
HOWELL, MICHIGAN
*Representatives in All Principal Cities*



# A TRUE FISH STORY

## *on the profit in quick freezing!*

A FISH DEALER in Lansing, Michigan, saw a way to longer profits if he could buy lake fish in carload lots when the fish were plentiful and cheap and sell them later when prices were higher. The problem here was to be able to keep the fish fresh and wholesome until top prices prevailed. Here's how he did it.

He installed a direct expansion system with Freon* refrigerants to quick-freeze the fish and thus keep them fresh indefinitely. This system, which freezes with plates instead of with brine pipes, enables him to freeze the big fish sliced and the small fish whole. Temperature in the cabinet is held at −25°F., and in the plates at −35°F. He installed also a 30°F. storage room for the intake of fresh fish, and a −10°F. storage room for holding the frozen fish until they are sold.

This dealer has been able to pay for his refrigeration system in easy installments out of the money he saves by buying and selling at the best possible prices.

Fish dealers, produce men, and other handlers of perishable foods can profit handsomely by installing a quick-freezing storage plant with a refrigeration system using Freon* refrigerants.

### What makes a system using Freon* refrigerants so profitable?

**IT'S HARMLESS!**

Freon* refrigerants end any danger of heavy losses through spoiled meat, fruit or vegetables in the event of refrigerant leakage. (This makes a big hit with locker plant operators and patrons.)

**IT FREEZES FASTER!**

Direct expansion refrigeration makes the plate system of quick freezing the fastest economical freezing known. Foods in direct contact with the plate freeze faster than when they rest on pipes, which provide only a fraction of the cooling area.

**IT ELIMINATES BRINE PIPES!**

Plates take the place of the usual large amount of brine pipe. The elimination of pipes cuts down expense and reduces dehydration of unwrapped foods.

**SIMPLIFIED DEFROSTING!**

Any frost that does form can be easily and quickly removed with a brush. This is important because it ends the losses in efficiency caused by heavy frosting of pipes.

**LOWERS OPERATING COSTS!**

As noted, less frost means less expense. In addition, a system that uses brine adds to horsepower needs, often steps up power costs as much as 25%. And because of its compactness and fast freezing, the direct expansion system cuts down the size of the quick-freezing room and thus increases the space available for lockers.

KINETIC

# FREON

REG. U. S. PAT. OFF.

*safe refrigerants*

**"Freon" is Kinetic's registered trade mark for its fluorine refrigerants.*

**KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE**

# Men, Jobs & Companies

## INDUSTRY

**Abbotts Dairies, Inc.,** Philadelphia, is erecting a $100,000 ice cream distribution station in Newark, N. J.

**Armour & Co.,** Chicago, will construct a $500,000 plant in Kansas City, Kan.

**British Columbia Packers, Ltd.,** Vancouver, has installed a smokehouse at its New Westminster, B. C., plant The smokehouse is of the type in use at the Prince Rupert Fisheries Experimental Station of the Dominion Department of Fisheries, which has been developing new methods of preparing canned smoked salmon. Such a smokehouse was installed last year at the Canadian Fish and Cold Storage Co. plant in Prince Rupert, where it is being used for cold smoking of kippered herring and black cod.

**California Packing Corp.,** San Francisco, has plans for a $500,000 tuna canning plant and pier in San Diego in case it is granted a lease on a section set aside for canneries in that city.

H. C. DIEHL

***He has been appointed chief of the commodity processing division of the Western Regional Research Laboratory. His headquarters will be at Albany, Calif., where a new laboratory is being constructed. In his new position, Mr. Diehl will continue to direct the research work on fruits and vegetables and on the freezing of foods which he had been directing as head of the Frozen Pack Laboratory of the United States Department of Agriculture, at Seattle, Wash.***

**Canadian Sugar Factories, Ltd.,** Raymond, Alta., is planning to build beet sugar refineries in Raymond and Chin, at an estimated cost of $200,000 each.

**Corn Products Refining Co.,** New York, has begun the manufacture of plastics from corn, known as Mazein, at its Pekin, Ill., plant. Experimental work has been conducted at the Argo plant, and a reported $1,000,000 has been spent on the new department, including the cost of the Pekin plastics plant, which has a capacity for 5,000 lb. of the material daily.

**Cudahy Packing Co.,** Chicago, will move its meat canning operations from Kansas City to Omaha next fall. More than $400,000 will be spent for a building and for meat canning and sausage making equipment.

**Domino Canning Association,** a recently organized cooperative, has acquired the plant of the bankrupt Whitefield Citrus Products Corp. at Bradenton, Fla. The plant will be reconditioned and modernized as a citrus canning plant. R. H. Prine, president of Domino Citrus Association, is president of the new cooperative, and Claude E. Street, manager of Florida Grapefruit Canning Co., Manatee, has been named general manager in charge of production and sales.

**General Foods Corp.,** New York, has appointed Hudson's Bay Co., Winnipeg, chartered by Charles II in 1670, exclusive distributor in Canada of Birds Eye frosted foods. Birds Eye quick frozen green peas have received the seal of acceptance of the Council on Foods of the American Medical Association.

**Loft Candy Corp.** stock held by Phoenix Securities Corp. has been sold to a group headed by Albert M. Greenfield and Jacob Beresin, both of Philadelphia. The entire Phoenix holdings, 473,400 shares, were sold. There are in all 1,473,259 shares outstanding. Mr. Greenfield was elected chairman of Loft Candy and Mr. Beresin was named president.

**Malbis Bakery Co.,** Mobile, Ala., will erect a cookie plant and garage and make additions to its present plant, at an estimated cost of $300,000 for buildings and equipment.

**John Morrell & Co.,** Ottumwa, Iowa, will spend more than $43,000 for a one- and two-story addition to its Mobile, Ala., plant.

RIDGWAY KENNEDY, JR.

***Abbotts Dairies, Inc., Philadelphia, has elected him vice-president. Mr. Kennedy has been in charge of ice cream manufacturing for Abbotts since 1919, when ice cream was added to the company's wholesale and retail milk business. Dr. J. A. Webb, connected with fluid milk operations, has also been promoted to a vice-presidency.***

**Neuhoff Bros.** has opened a new $500,000 meat packing plant in Dallas, Tex. A uniform mixture of smoke and conditioned air, which is exhausted and recirculated, is maintained in the sausage smokehouse by means of ceiling ducts. The entire plant is air conditioned.

**Peerless Bottlers, Inc.,** Chicago, has filed a registration statement with the Securities and Exchange Commission, covering a new issue, proceeds of which would be used to acquire the capital stocks of Orange Crush Bottling Co., Jackson Orange Crush Bottling Co. and Pepsi-Cola Bottling Co.

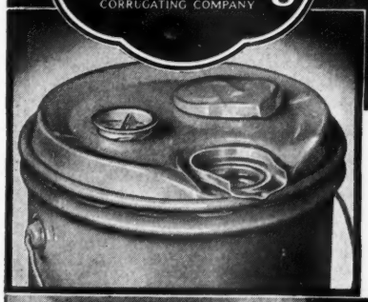
**E. Pritchard, Inc.,** Bridgeton, N. J., has acquired the jelly and preserve department of Atmore & Son, Inc., of Philadelphia. Roy L. Richardson will be in charge of jelly and preserve production.

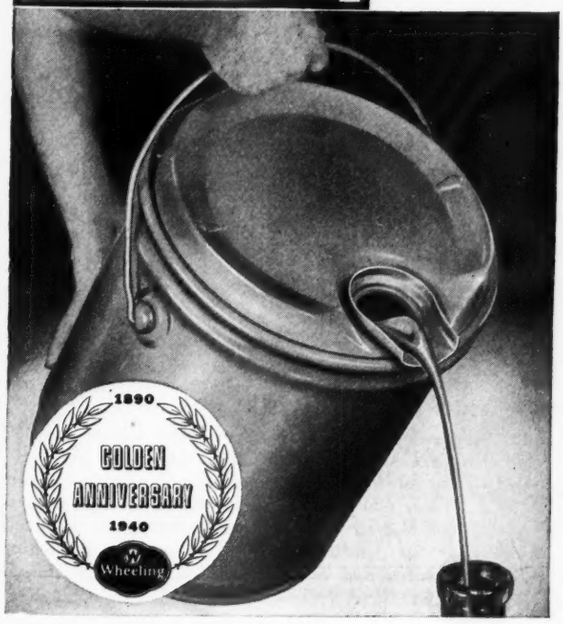
**Ralston Purina Co.,** St. Louis, will build a $250,000 brick, tile and stone plant near Lubbock, Tex.

**Schenk Provision Co.** has opened a new plant at Greensboro, N. C., which was built to meet the need for more localized manufacture of meat products in the Southeast.

"Here's where we started to pack in
WHEELING
Steel CONTAINERS"

Wheeling
CORRUGATING COMPANY






● Sales react quickly when the trade learns that your product includes the last word in safe, convenient packaging. Wheeling Steel Containers—available in 1- to 70-gallon capacities—will give your product the ultimate in utility, accessibility, and security. Among our many items, we are sure to have the right container, with the right closure—and at the right price. Tell us what you pack, and we'll gladly submit samples.

**WHEELING**
**CORRUGATING COMPANY**
*General Offices:* WHEELING, WEST VIRGINIA
OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

*Don't Let Your*

**PUMPING PROBLEMS**

*Throw You . . . .*

The minute you find yourself up against a puzzling pumping problem, it's time to get in touch with Viking. Just write in detail the food product you're pumping, the type of pump you need, the amount of room you can spare for installation, the required drive arrangement. That's all there is to it . . . you leave the rest to Viking's engineering superiority, Viking's years of experience, Viking's complete knowledge of Food Factory pumping needs. Write that letter today . . . we'll mark it for "special attention".

Look For This Trade Mark — The Sign Of A Genuine Viking

**VIKING PUMP COMPANY**

CEDAR FALLS, IOWA

**Sunshine Packing Corp.**, Cleveland, will build an addition and make alterations to its North East, Pa., plant, at an estimated cost of $40,000. A frozen foods division will be installed.

**Swift & Co.**, Chicago, will construct a cottonseed oil mill in Portageville, Mo., which will have an annual crushing capacity of from 15,000 to 18,000 tons of cottonseed. The oil produced will go to the company's shortening plants in Memphis and Chicago.

**Western Dairies, Inc.**, and its subsidiaries, the Arden Farms Co. and Arden Farms, Inc., propose to simplify the corporate structure and capitalization of the organization and change the name to Arden Farms Co.

**Williamsport (Pa.) Coca-Cola Bottling Works, Inc.**, is planning to build a modern one and two-story brick, steel and concrete plant, warehouse and garage to cost $75,000 with equipment.

## PERSONNEL

**D. H. Daggett** has been made assistant to the president of General Seafoods Corp., Boston.

**W. R. English**, manager of the lard department of Cudahy Packing Co., Chicago, since 1905; R. C. Johnson, manager of the smoked meat department since 1904; and F. E. Ryner, manager of the dry salt meat department since 1901, have retired. All of them joined the company in the 1890's when headquarters were in Omaha. Since retiring from Cudahy, Mr. Johnson has become associated with E. G. James Co., packinghouse products brokers of Chicago.

**F. W. Evans** has been named manager of a newly created grapefruit department of California Fruit Growers' Exchange. He had been export representative in London before the outbreak of the war.

**Colin S. Gordon** has been elected a vice-president of Quaker Oats Co., Chicago, to succeed the late James C. Murray.

**V. L. Hubbard**, president of Meadow Gold Dairies, Inc., Pittsburgh, has been appointed manager of the Rocky Mountain division of Beatrice Creamery Co., with headquarters in Denver. He replaces A. T. McClintock, senior vice-president of Beatrice Creamery, resigned.

**Frank Mohr**, former brewmaster for Marshfield (Wis.) Brewing Co., has acquired Medford (Wis.) Brewing Co.

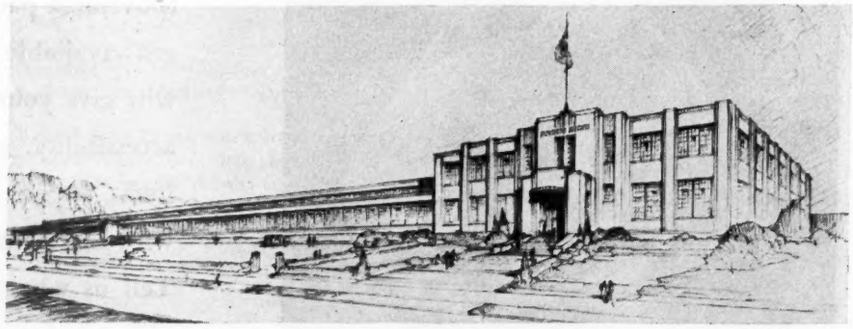
**George K. Morrow** has resigned as chairman of the board of Hecker Products Corp., New York, but will remain on the board of directors and on the executive committee. Randolph Catlin, chairman of the executive committee, becomes chairman of the board. Mr. Morrow was one of the founders and was first president of the original Gold Dust Corp.

**H. L. Popp**, vice-president and general manager, Perfection Biscuit Co., Fort Wayne, Ind., has been elected president of Independent Biscuit Manufacturers' Co., Inc. C. H. Wortz, Jr., president of Wortz Biscuit Co., Fort Smith, Ark., was named vice-president.

**J. D. Richardson** succeeds Gordon Walker, resigned, as manager of the New York City branch of Fairmont Creamery Co.

**J. Rossmeyer**, of Baltimore, has been elected president of National Association of Flour Distributors.

**Herman F. Veenker** has become general superintendent of the three midwestern plants of John Morrell & Co., Ottumwa, Iowa. H. C. Morris has advanced from assistant superintendent to superintendent of the Ottumwa plant. Thomas Ogle, formerly foreman of the fresh meat department at Sioux Falls,



**TWO MILLION DOLLAR BAKERY**

***Drawing of the "world's most modern" $2,000,000 bakery being constructed at Oakland, Calif., by Loose-Wiles Biscuit Co. Materials will be stored in the basement and automatically conveyed to the second floor for mixing. Gravity conveyors will deliver the dough to the main floor, where the ovens, said to be the longest and largest ever built, will be located. After forming and baking, the products will come out on a 1,000 ft. conveyor for conditioning and delivery to packaging equipment. The plant will be air conditioned and the roof will be "insulated" with a lagoon of water 4-in. deep.***

S. D., has been named divisional superintendent at that plant.

**H. H. Wheeler** has been elected president of National Cheese Institute.

## DEATHS

**Emil Blumlein,** vice-president and head of the export department of S & W Fine Foods, Inc., San Francisco, May 25. He had been with the company since its organization about 47 years ago. His brother, J. Blumlein, is president of the company.

**Harry Epstein,** 43, president and general manager of Meadow Gold Products Corp., Brooklyn, N. Y., subsidiary of Beatrice Creamery Co., recently.

**Frank M. Firor,** 70, retired president of Adolf Gobel, Inc., New York, May 26.

**T. B. Freeland,** 73, president of American Rice Milling Co., Crowley, La., May 21.

**Lewis Hull,** 85, chairman of the board and co-founder of Hull & Dillon Packing Co., Pittsburg, Kan., June 11.

**Herbert Jones,** retired president of California Preserving Co., Los Angeles, recently.

**R. E. Paine, Sr.,** 83, chairman of the board and one of the founders of Houston (Tex.) Packing Co., June 4.

## ASSOCIATED INDUSTRIES

**Allis-Chalmers Manufacturing Co.,** Milwaukee, has announced the death of its board chairman, Gen. Otto H. Falk, May 21.

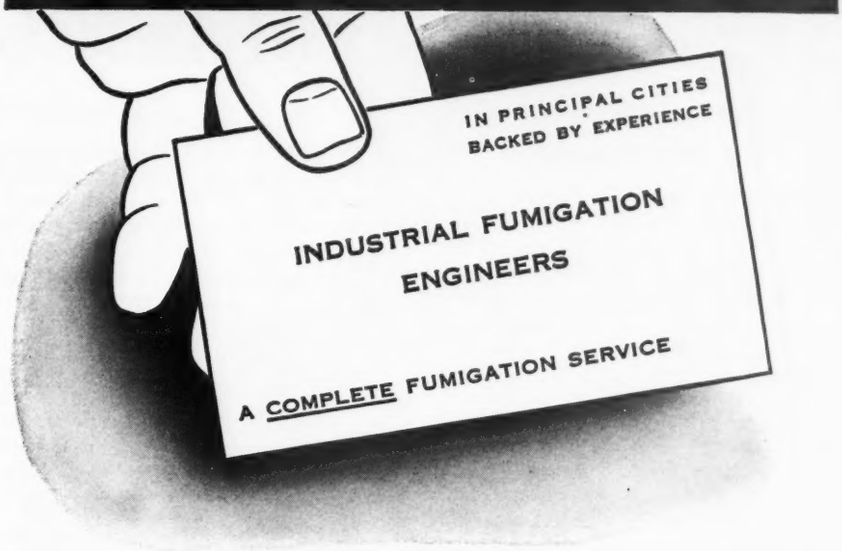
**E. I. du Pont de Nemours & Co.,** Wilmington, Del., has appointed Clarence F. Brown as director of sales of the Cellophane division to succeed Oliver F. Benz, resigned.

**General Mill Equipment Co.,** Kansas City, Mo., will act as sole distributor for Wolf Co., Chambersburg, Pa., manufacturers of milling machinery.

**Hoffmann-La Roche, Inc.,** Nutley, N. J., has reduced its price on vitamin $B_1$ (thiamin chloride).

**Package Machinery Co.,** Springfield, Mass., has announced an agreement with Smith-Lee Co., Oneida, N. Y., whereby the latter firm will act as exclusive sales distributors for the company's milk bottle hooding machine. Smith-Lee will absorb the complete sales staff of Package Machinery's milk bottle division, with the exception of T. Miller, who will remain with Package Machinery as a liaison officer.


# OUR CARD
## Mr. Production Manager




HERE is a thorough service for the Food and Milling Industries. Its purpose: to give you a better, more complete method of insect and rodent control, and to save you money at the same time.

Here are the reasons this is possible: There is a great deal more to proper pest control than merely applying an insecticide or fumigant. The Industrial Fumigation Engineer knows this from long experience in the field—experience with all types of insect infestation, under all conditions in plants in the many branches of the Food Industry. This enables him to recommend the most efficient, most economical method of control for the particular requirements of *your* plant.

A complete survey of your plant and careful study of conditions by an Industrial Fumigation Engineer may result in his recommending that a special piping system be installed, and that the building be fumigated with LIQUID HCN at certain intervals. Again, he might suggest that your product be fumigated in a special room at a certain stage of production. In other cases, fumigation under a vacuum might be indicated as the best solution.

In brief, the Industrial Fumigation Engineer is prepared to take over the entire problem of pest control in your plant—he knows fumigation and the conditions and ways in which it can be used most economically and effectively; he supplies the right materials; provides trained and experienced workers; protects you with liability insurance, and makes periodic inspections to assure you of complete pest control at all times throughout all seasons of the year.

A trained Industrial Fumigation Engineer will survey your plant, and report his findings and recommendations for pest control—together with an estimate of the costs involved—without any obligation to you.

Write us for further details, and the name of the Industrial Fumigation Engineer nearest you.

### WHAT IS THE BEST METHOD OF INSECT CONTROL?

• Liquid hydrocyanic acid is universally used for insect control in modern food and milling plants. Ways and means of applying it can be adapted to suit most industrial conditions, at a saving in time and cost as compared to other methods of insect control. The largest food manufacturing plants in the country now obtain complete all-year round insect control by means of a consistent program of fumigation with LIQUID HCN. The answer to insect control in your plant, and the most economical method, can be obtained from the Industrial Fumigation Engineer.

**American Cyanamid & Chemical Corporation**
INSECTICIDE DEPARTMENT
30 ROCKEFELLER PLAZA • NEW YORK, N. Y.
KANSAS CITY, MO. • AZUSA, CALIF.

# Just off the Press

## BOOKLETS • LITERATURE • BULLETINS

### *Food Plant Equipment*

BOTTLING EQUIPMENT—A complete line of equipment for the beverage bottling plant is described and illustrated in a 192-page spiral-bound general catalog entitled "Bottling Engineer Handbook," published by U. S. Bottlers Machinery Co., 4015 N. Rockwell St., Chicago.

CANDY CUTTER—The Jap cutter for cutting candy slabs into various desired sizes is described in a 4-page folder issued by J. C. Anderson & Co., 9th and Thompson Sts., Philadelphia, Pa.

CENTRIFUGAL MACHINES—In an illustrated 8-page bulletin entitled "Centrifugal Force Brings Speed to Scores of Jobs" the application of various types of centrifugals in industries is described by American Tool & Machine Co., 1415 Hyde Park Ave., Boston, Mass.

DRYING EQUIPMENT—The "Aero-Form" drying system for the continuous drying of wet-solid and plastic materials is described with application data in illustrated 12-page Bulletin No. 100 of Proctor & Schwartz, Inc., 7th St. and Tabor Road, Philadelphia, Pa.

DRYING EQUIPMENT—Vacuum rotary driers for fast drying at low temperature of such products as starch and fish meal, and for the recovery of solvents, are described and illustrated in 24-page Bulletin No. 324 published by Buffalo Foundry & Machine Co., 1635 Fillmore Ave., Buffalo, N. Y.

FACTORY LIFT TRUCK—An 8-page bulletin entitled "Mighty Midget Mobilift" describes a gasoline-driven lift truck of light weight which is particularly adapted to canneries and other food plants, made by Vaughan Motor Co., Portland, Ore.

FOOD CUTTING MACHINE—Various types of cutting, dicing and cubing machines for fruits, vegetables and meat products are described in a 4-page folder issued by J. C. Anderson & Co., 9th and Thompson Sts., Philadelphia, Pa.

MATERIALS HANDLING EQUIPMENT—Redler conveyor and elevator equipment is fully described, with specifications and photographic illustrations of installations, in Catalog No. 140, a 64-page publication of Stephens-Adamson Mfg. Co., Aurora, Ill.

MILK EVAPORATORS—Stainless steel evaporators for the production of evaporated and condensed milk products, of single and double effect types are described and pictured in Bulletin No. 319 of Buffalo Foundry & Machine Co., 1635 Fillmore Ave., Buffalo, N. Y.

MIXING EQUIPMENT—In Catalog No. 402 the "Homo-Mixer," a mixer designed to operate without incorporating air into the product, is described by Eppenbach, Inc., 45-10 Vernon Boulevard, Long Island City, N. Y.

WATER STILLS—F. J. Stokes Machine Co., Tabor Rd., Philadelphia, Pa., has published Bulletin No. 907, describing a complete line of water stills in sizes from ½ gal. to 6 gal. per hour capacity, with specification data and list prices.

### *Plant Accessories and Supplies*

ARIDIFIER—Typical installations of Aridifiers for centrifugal removal of moisture, oil, dirt and fine scale from compressed air and gas streams are illustrated in Bulletin 340 by Logan Engineering Co., 4912 Lawrence Ave., Chicago, Ill.

FITTINGS—Split clamps for Van Stone type joints, stainless steel butt welding fittings, and stainless steel low pressure flanged fittings and carbon steel split back-up flanges form the subject of three recent brochures of The Cooper Alloy Foundry Co., 150 Broadway, Elizabeth, N. J.

HOISTING—Complete information on hoisting equipment and various models of chain hoists, trolleys and electric wire rope hoists is presented in a 44-page illustrated catalog by The Yale & Towne Manufacturing Co., Philadelphia Division, Philadelphia, Pa.

ODOR ABSORBERS—Devices for controlling and absorbing odors in air conditioning and ventilation through use of activated coconut shell carbon are described and illustrated in a new catalog of W. B. Connor Engineering Corp., Dorex Division, 114 E. 32nd St., New York, N. Y.

PAINTS—Application data, special properties and directions for use of Acidseal Protective Coatings, corrosion-resisting paints derived from rubber, are set forth in 4-page Catalog Section 9770 by The B. F. Goodrich Co., Akron, Ohio.

SPRAY GUN—The new Speedmaster metal spray gun, claimed to rebuild shafts, cylinders and rods at savings up to 80 per cent, is announced in a recent 4-page folder by Master Metal Spray, Inc., 2527 Magnolia St., Oakland, Calif.

V-BELTS—Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has issued Catalog No. 151, entitled "Tex-Book of Engineering Information on Special or Made to Order Texrope V-belt Drives", introducing new horsepower ratings based on the formula recently adopted by the industry.

VALVES—General Electric Co., Schenectady, N. Y., has issued brochure GEA-1569B on thrustor-operated valves, CR9507-L, for pipe sizes of 1 in. to 10 in.

### *Packaging*

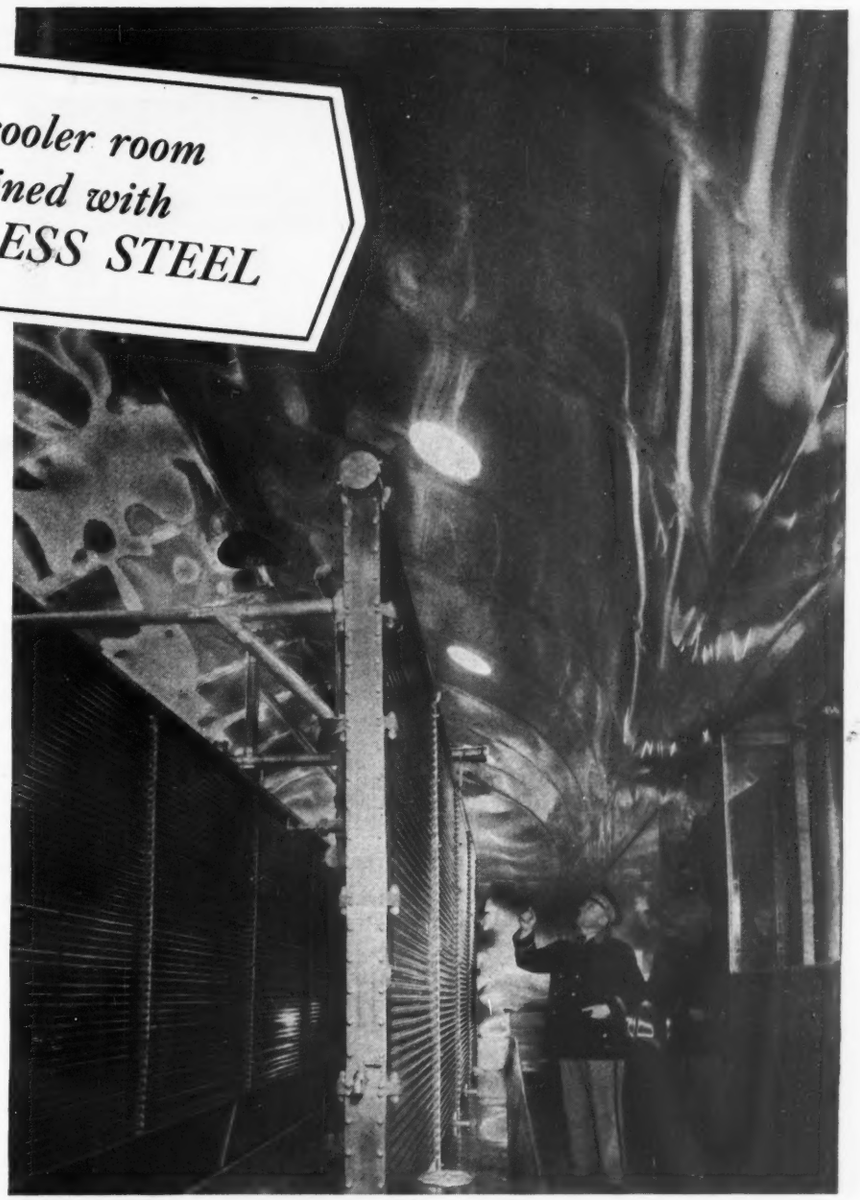
CONTAINER WEIGHING EQUIPMENT—Two new catalog pages, one showing the use of scales in coffee packaging, and the other the use of scales in fruit canning, have been issued by the Exact Weight Scale Co., Columbus, Ohio.

PACKAGING MACHINERY—In its new catalog No. 910, a catalog of pharmaceutical equipment, machines for filling tubes, for closing and sealing containers, and for filling powders, are described by F. J. Stokes Machine Co., Tabor Road, Philadelphia, Pa.

# To guard the quality of

## "THE BEER THAT MADE MILWAUKEE FAMOUS"

*A new wort-cooler room completely lined with U·S·S STAINLESS STEEL*



WORT, or freshly brewed beer, is highly sensitive to contamination of any kind. During the cooling process, positive cleanliness is absolutely essential. Even the incoming air must be carefully filtered.

To safeguard the wort during this critical step, the Jos. Schlitz Brewing Company recently installed this new wort-cooling room, completely lined with highly polished, jointless, U·S·S Stainless Steel sheets.

Here, in this spotless room, the delicate, brewed-in flavors are safe. The brilliant stainless walls and ceiling will always remain bright, rust-free, as easy to clean as a mirror.

U·S·S Stainless Steel here illustrates its ability to prevent contamination and to help assure a uniformly high quality product. Wherever it's important to surround a process with a clean, durable, non-reactive material, use this metal. It safeguards product quality, saves cleaning time, and prolongs equipment life. Hardly a food or chemical plant of any kind operates today without taking advantage of the properties of U·S·S Stainless Steel. Write today for data.

**LIKE A HOUSE OF MIRRORS,** Schlitz' new wort-cooler room is completely lined with polished sheets of U·S·S Stainless Steel. The brilliant surface and welded joints provide maximum protection to the freshly brewed beer as it is cooled before it goes into the cellars for three to four months of aging. This unit is capable of cooling 400 barrels of wort per hour.

UNITED STATES STEEL

USS

**U·S·S STAINLESS STEEL**

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*

Scully Steel Products Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

# Food Equipment News

**REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES**

*Industrial lift-truck provided with top grip for load*

### *Lift Trucks with Lift-Grip*

TOWMOTOR Co., 1262 E. 152nd St., Cleveland, Ohio, has brought out the "Lift-Grip" truck. This industrial truck is constructed with an upper "jaw," extending from the top of the mast, with the purpose of preventing bouncing and spilling of light bulky loads, made up of many packages being transported for stacking.

In the illustration, the truck is shown picking up 24 cases of oranges in one load. When the forks of the truck have entered the pallet under the pile of crates, the hydraulic lifting mechanism is set in motion by means of a lever at the driver's right hand. The load then moves up until the upper "jaw," with its spring-tension grip, is in contact with the top of the pile. With a self-compensating spring tension mechanism, the pressure is just enough to keep the pile in alignment and prevent spillage while the load is being moved from one point to another.

An additional advantage of this new truck is said to be that by keeping the group of packages in alignment, it permits more accurate stacking. Also the pallets can be loaded to the full height.

This truck is adaptable for other uses, as the upper "jaw" can be removed when desired.

### *Mechanical Ring-Balance Meter*

A NEW mechanical meter of the ring-balance type for measuring steam, water, gas, air and other fluid flow at static pressures up to 1,000 lb. per sq. in. has been developed by Republic Flow Meters Co., Chicago, Ill. This meter will give full-scale readings on differentials as low as 3 in. of water. It is housed in a strong steel case suitable for use in exposed locations. It is easily adjustable by changing a calibrating weight. The chart used is 12 in. in diameter and had even graduations. The meter is furnished with any combination of indicator, recorder and cyclometer type integrator.

### *High Vacuum Gage*

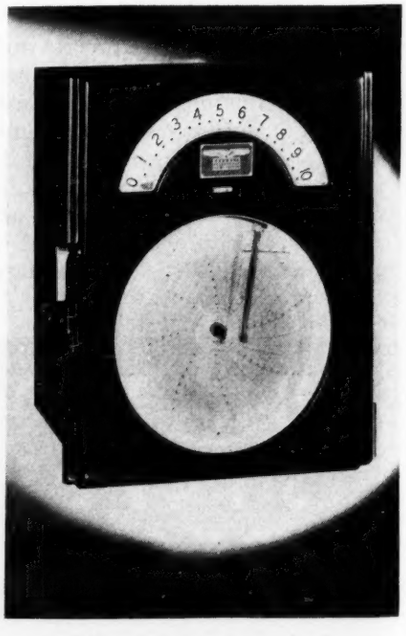
F. J. STOKES MACHINE Co., Philadelphia, Pa., has brought out a new model portable high vacuum gage with a range from zero to 700 microns, calibrated down to 1/10 micron. This instrument, which is somewhat larger and heavier than previous instruments operating on the McLeod principle, has been designed to enable the unskilled operator to take readings quickly and accurately. It is built to withstand hard service and constant handling without breakage or damage.

### *Pliofilm Wrapping Machine*

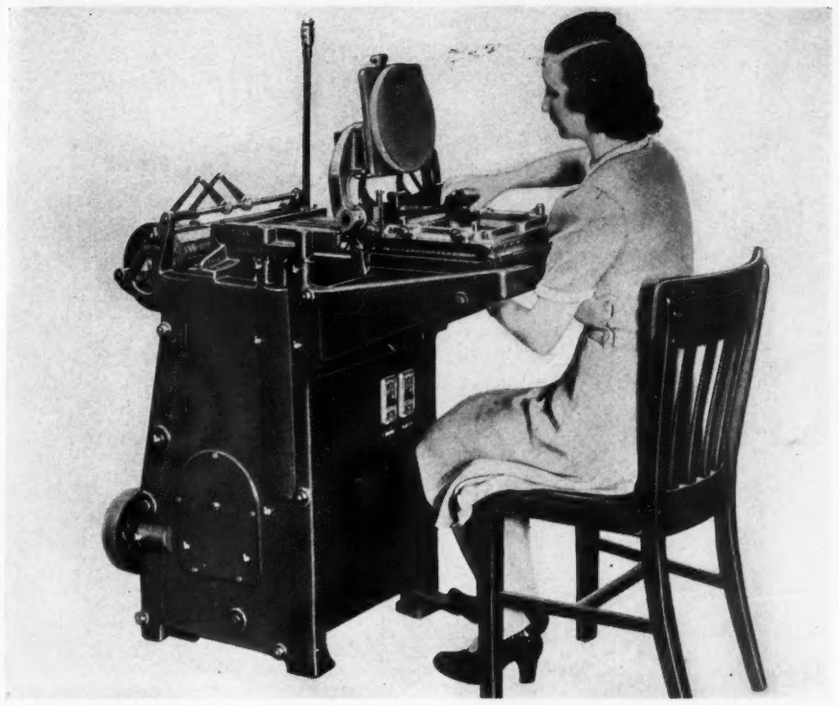
STOKES & SMITH Co., Summerdale Ave. and Roosevelt Blvd., Philadelphia, have developed the "Stretchrap," a universal wrapping machine for use with Pliofilm.

In this machine, Pliofilm is fed from a roll through a series of feeding bars into the carriage. This carriage holds the frame for the desired width of film. When the operator trips the machine, the carriage travels back until the sheet of Pliofilm is completely in the frame. The clamping mechanism is then clamped down and the Pliofilm is held tightly. The carriage then moves forward with the Pliofilm in it.

Next, a heating platen, electrically heated and thermostatically controlled, is lowered onto the Pliofilm sheet and held there for the correct length of time. The platen then raises and the operator takes the article to be wrapped, sets it into the center of the Plio-




*Meter for measuring flow*



*"Stretchrap" machine for wrapping articles in Pliofilm*

film, draws it through the bottom and twists it at the same time. Then, when the treadle is depressed again, a knife mechanism cuts off the Pliofilm, releases the sheet and the entire cycle is then repeated.

This machine requires one operator and has a capacity of wrapping approximately 10 articles per minute. In the food industries, it has been used for placing transparent moisture-proof Pliofilm wrapping around containers, and individual products of many types.

### *Non-Aerating Juice Filler*

HORIX MFG. Co., Corliss Station, Pittsburgh, Pa., has developed a special non-aerating juice filler, as shown in the accompanying illustration. This machine is equipped with bottom-fill valves in order to minimize the agitation of the product while the cans are being filled. It also has a specially designed tank and feed-line construction so made as to prevent contact of the inflowing juice with air.

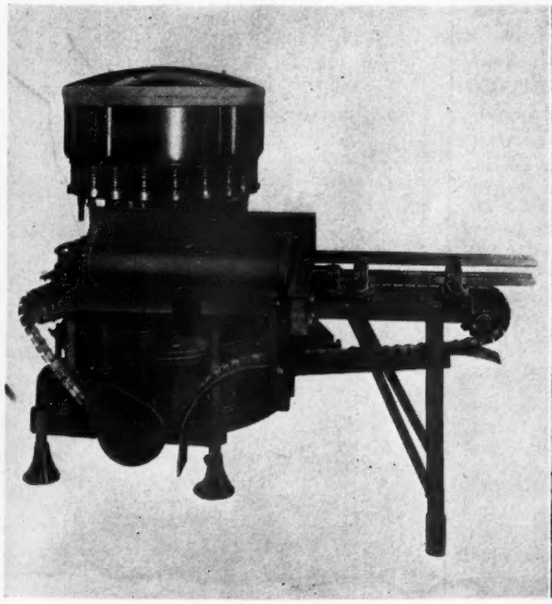
### *Horizontal Plate Filter*

SUITABLE FOR USE in the filtering of beverages, milk, sirups and many other food products, Sparkler Mfg. Co., 1210 Webster Ave., Chicago, Ill., has brought out what is claimed to be the only horizontal plate diatomaceous earth filter available. In this filter the plates are nested one on top of another in horizontal position so that the filtering process is always conducted straight downward. The filter cake lays in a flat, horizontal position on the plate. Advantages of this system are said to be: more uniform coating; less time for pre-coating; ability to build and hold thicker filter cakes and hence greater capacity; the cakes cannot break, crack or fall off, thus giving always uniform results; any type of filter paper may be used to hold the filter aids; the filter is simple to clean, there being no cloths or screens to wash.

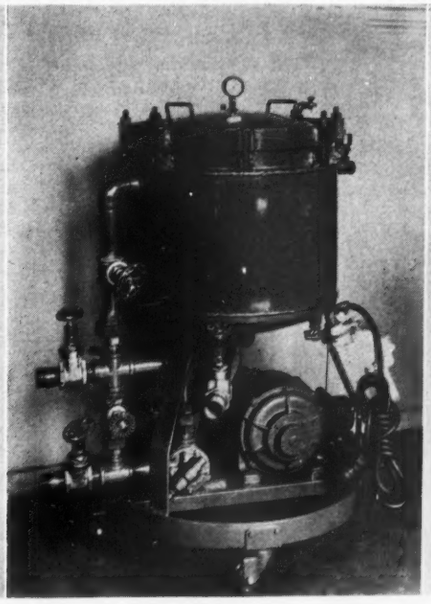
Four models of this filter are available, covering a range from 1 to 1,000 gal. per hour. Materials of construction are suitable for the liquid to be handled. The model shown is the PG-18-8, with capacity from 500 to 1,000 gal. per hour and operated with a ½ to 1 hp. motor, depending upon the liquid handled.

### *Flake Ice Machine*

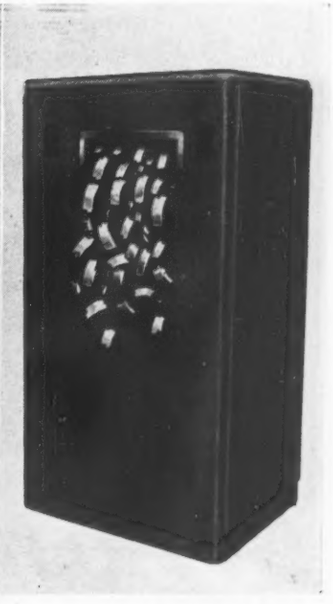
A SMALL self-contained "FlakIce" unit capable of producing up to 2,000 lb. of "FlakIce" per day has been developed by York Ice Machinery Corp., York, Pa. This unit is so designed that it can be installed quickly with only water and electrical connections necessary to put it in opera-



*Nonaerating juice filler for cans*



*Horizontal-plate filter*



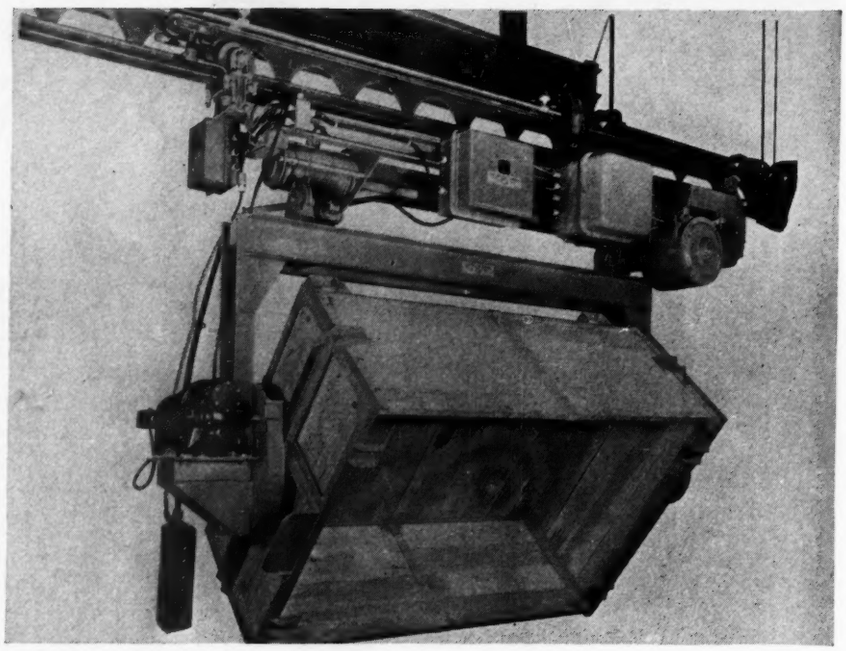
*Small "FlakIce" machine*

tion. Hitherto, "FlakIce" machines have only been available in large sizes such as those used in many milk bottling plants. The new small unit is designed for application in such operations as sausage manufacture, small dairies and similar locations where a relatively small quantity of "FlakIce" is desired at any one time.

### *Monorail Conveyor Carrier*

CLEVELAND TRAMRAIL DIV., Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a full-rotation box grab and tramrail carrier, suitable for conveying a wide range of materials. With this carrier, boxes may be turned in any position by means of a gear-motor drive, and if desired, a complete turn can be made. The grab is for use where gradual dumping is required. The box may be raised or lowered as desired, a twin hoisting unit being used. Boxes are securely clamped in position by a handwheel located at the end opposite the gear-motor rotating mechanism.

The unit illustrated is for boxes 48 in. wide, 72 in. long and 30 in. deep. This size will carry up to 2,000 lb. of material. It has a full loading hoisting speed of 20 ft. per min. and its travel speed in the horizontal direction is 150 ft. per min. The push-button control is for all operations, including turning. While a wooden box is shown in the illustration, the box may be made of steel or other material as desired.

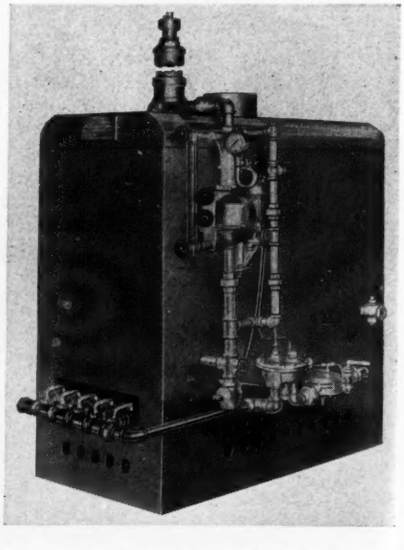


*Box carrier for monorail conveyor*

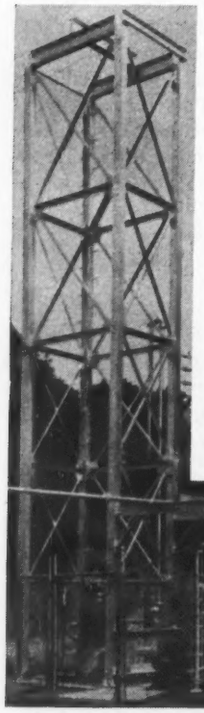
Application of this conveying device is wide, but the most usual installation is for moving materials from storage to processing machines.

### *High Speed Automatic Boiler*

ANETSBERGER BROS., Chicago, Ill. has put on the market a high speed, low-pressure, automatic steam boiler, particularly designed for use in open line process steam work. This unit is designed to conform to the A.S.M.E. code specifications in material, workmanship, construction and inspection. It is equipped with a fully automatic water feeder to maintain water at the correct level, also with an automatic low water cutoff which turns the gas



*Low pressure, high speed boiler for process work.*

"INSTALLED IN 1932, This STERLING Turbine Pump IN PERFECT CONDITION TODAY!"

***Read This Excerpt From a Letter of J. L. Biddle, Supt. of Maintenance, WESTVACO CHLORINE PRODUCTS, INC.***

"WE installed the first Sterling Turbine Pump in 1932 at 500′ setting. This pump has been in continuous service since that date except when we pulled the well to inspect the pump and lower pump to 700′ setting. On May 26, this year (1936), we again pulled this pump to inspect it, and again found it to be in perfect shape.

"Since 1932 we have installed many more of the same type of Sterling pumps . . . we are 100% sold on them!"

Such a statement by a man of authority who has no personal axe to grind should mean much to you who seek long-lived, trouble-free pump operation. Write for full details, catalogs and prices—today.

● Few sterling Pump owners need service—but if you need it, Sterling offers the highest class of service from coast to coast.

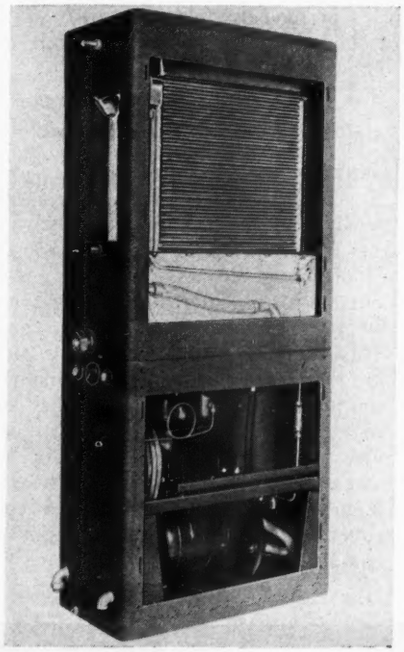
STERLING
DEEP WELL TURBINE PUMPS

STERLING PUMP CORP.
Hamilton, Ohio Stockton, Calif.

fuel off when the water gets too low. In addition, there is an automatic gas control to turn the fuel on and off in accordance with the amount of steam being used. High speed and low cost of operation are said to be achieved through the design of the firepot and water tube with firebrick insulation and a completely insulated outer steel shell. Arrangements have been made in the design for ease of cleaning.

### *Water Cooler*

York Ice Machinery Corp., York, Pa., has introduced the "Cold Well" water coolers in 3 and 5 hp. models for use in cooling process water for bakeries, dairies, bottling plants and for other similar applications, as well as for the production of cold drinking water. These models are housed in modern-style cabinets and are cooled by means of a "Balanseal" condensing unit located in the base of the cooler.

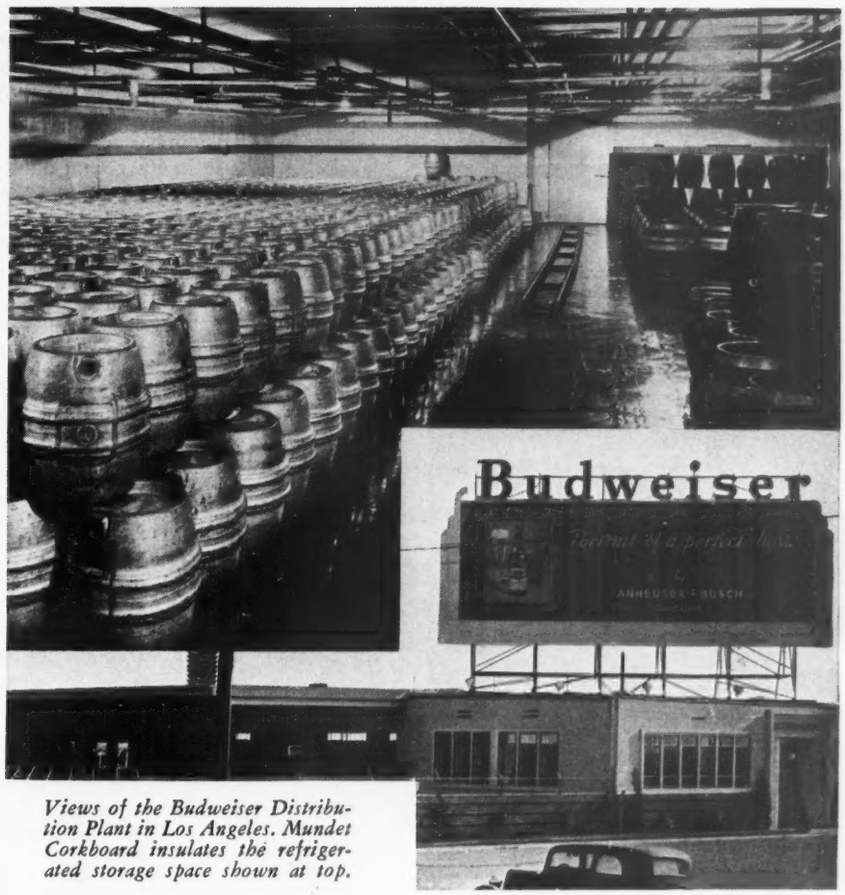


***Unit water cooler available in 3 and 5 hp. models.***

Four models are available: a light duty 3 hp., a heavy duty 3 hp., a light duty 5 hp., and a heavy duty 5 hp.

### *Booster Compressor*

Frick Co., Waynesboro, Pa., is making a refrigeration compressor for use with booster systems, which combines on one frame both the low temperature and high pressure cylinders. The machine has four big cylinders arranged in pairs and mounted vertically above an inclosed crankcase. Two low pressure cylinders, into which the lower pressure gas is first drawn,


*Views of the Budweiser Distribution Plant in Los Angeles. Mundet Corkboard insulates the refrigerated storage space shown at top.*

**ECONOMY for Users of Refrigeration**

When Anheuser-Busch, brewers of Budweiser, built their modern distribution plant in Los Angeles, Mundet Corkboard was specified for low temperature conservation. The insulation was supplied through the Mundet district office and warehouse, 1850 N. Main Street, Los Angeles. Here, as in other principal cities, Mundet maintains responsible engineering and installation services covering all phases of refrigeration insulation.

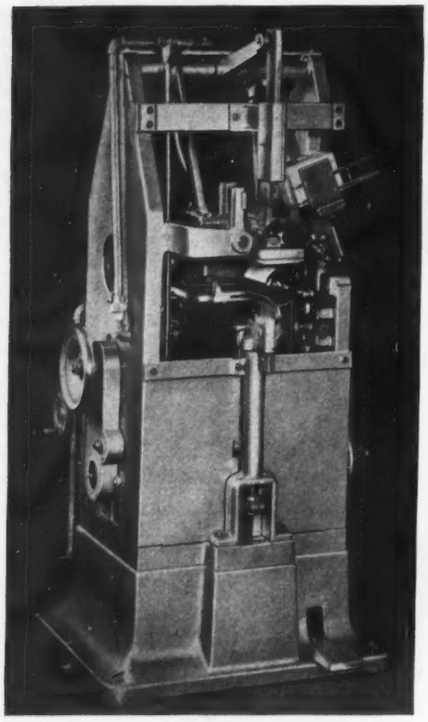
The fact that Mundet Cork Insulation is serving prominent firms in every industry where low temperature is required—and has rendered this service for many years—is an indication of its worth. Let us show you now how you can profit from Mundet Insulation Products and Services. Our recommendations do not obligate you to purchase. Mundet Cork Corporation, Insulation Division, 65 S. Eleventh Street, Brooklyn, N. Y.

**MUNDET CORK INSULATION**

CONSERVES LOW TEMPERATURE

# ANY SIZE SHAPE LABEL

*from ¾ of an inch to 6½ x 6½ inches*



**Applied Neatly and Precisely**

**by the Model CH**

# WORLD

**Semi-Automatic Labeler**

**The Model CH or its sturdy big brother the Model CHx applies this wide range of labels to containers of every size and shape from ampoules to 4″ in diameter. Sturdy, compact, easy to make quick, positive change-overs, the Model CH is a model of versatility, operating convenience and accessibility. It's the World's best bet for those who require high grade, low cost application of labels to a variety of packages. Write for the new, illustrated bulletin CH-8 for complete information on this new World Labeler.**

**ECONOMIC MACHINERY CO.**

**WORCESTER, MASSACHUSETTS**


have extra large bore. After passing through a water-cooled inter-cooler and a liquid and gas precooler, the ammonia enters the two high pressure cylinders.

This new compressor has been developed for use in ice cream plants, quick-freezing plants, locker storage and similar refrigeration service. In ammonia refrigeration systems in this type of low temperature work, it is claimed to save up to 34 per cent.

The same machine is suitable for use with Freon-12 on air conditioning work.

### *Capping Machine*

FOR PLACING its new VPO hermetic seal closure on glass-packed food product containers, Crown Cork & Seal Co., Baltimore, Md., has developed a new model of in-line capping machine called the "VPO Inline Capper". This machine is designed for installation in the production line and is capable of capping any shape of container from 2 to 12 in. in height at speeds up to 300 per minute. It is designed for installing with various types of conveyor equipment to suit various production line needs. In changing from one size container to another, only three adjustments are necessary: setting for height, setting for width and setting for the size of cap which is designated by indicating dial on the machine. All these adjustments can be made while the machine is in operation.

The new capper is equipped with a large cap sorting tray which will hold one case of caps. In operation, the operator turns the caps right side up and shoves them on to a revolving disk whence they are fed into the machine.

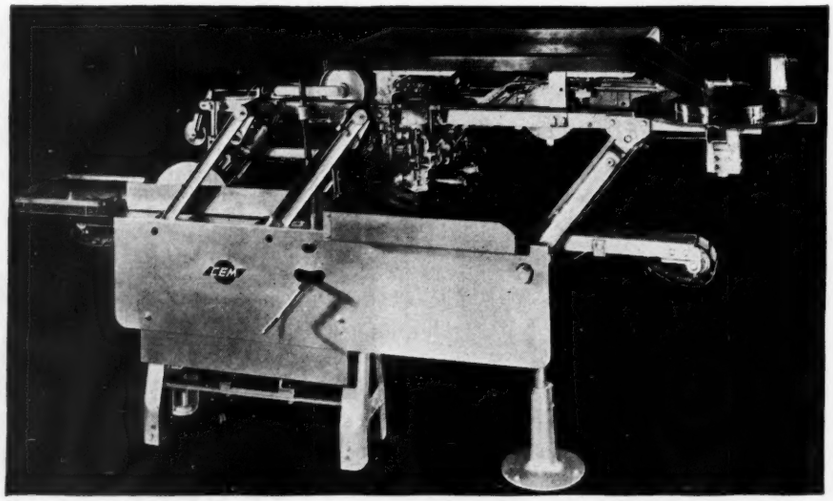
In operation, as the containers move along the conveyors they come in contact with a pair of steadying belts which hold them in upright position as each container picks off its cap from the cap feed chute. After the caps have been picked up, they are held in position on the mouth of the container by a leveling belt until they are pressed down and sealed by the capping head.

### *Finish for Food Equipment*

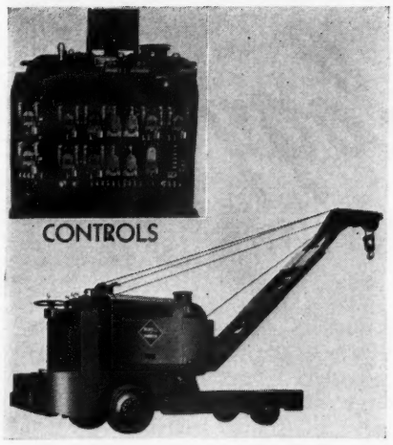
COOPER ALLOY FOUNDRY CO., Elizabeth, N. J., has developed a new type of electrolytic finish for its products, which is called "Lustracast." The process is not a surface coating but is an electrolytic bath said not only to clean and brighten the surface, but to provide a smoother surface which is consequently easier to keep clean and free from corrosion. Another advantage claimed for this finish, is that it assures longer life for the casting when in contact with corroding liquids. The new process is said to be particularly suitable for use with castings of food product equipment, as it produces a high polish impossible to obtain by burnishing methods.

### *Air Conditioning Valve*

GENERAL ELECTRIC CO., Schenectady, N. Y., has brought out a new inexpensive solenoid valve designed for the requirements of heating and air conditioning installations and also suitable for use in general applications for the control of air, water or gas. This valve is said to be suitable also for use in water control for humidifier equipment and for such installations as evaporative coolers. As this device is for incorporation into an assembly which has its own inclosure, it has not been provided with coil cover, conduit plate or other similar equipment.



*In-line capping machine for use with VPO closures.*




*Industrial power crane of 3,000 lb. capacity.*

### *Industrial Power Crane*

ELWELL-PARKER ELECTRIC Co., Cleveland, Ohio, has introduced a streamlined power industrial crane known as Model C-4. This crane has a rated capacity of 3,000 lb. at a 7-ft. radius and will travel at speeds up to 5½ m.p.h. It is equipped with a telescoping boom, 12 to 19 ft., and the boom will turn approximately through 300 deg. in 20 sec. Speed of raising the crane hook is from 30 to 50 ft. per min.

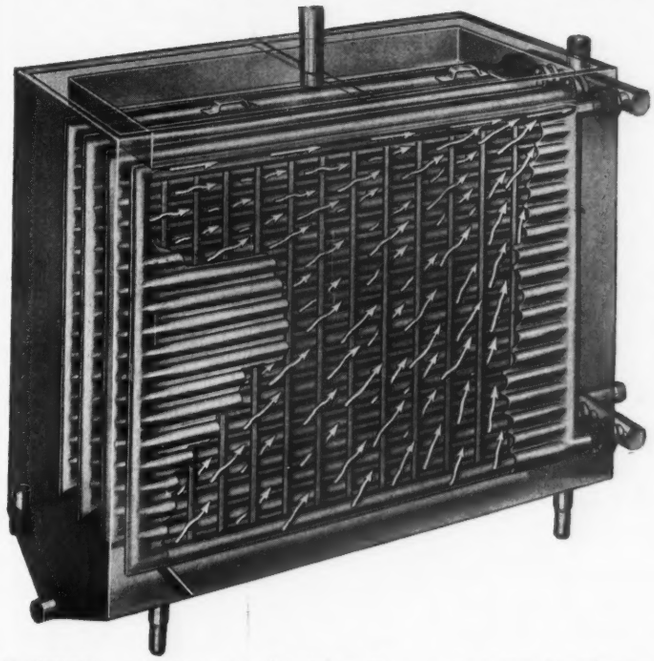
This new crane is powered either with a storage battery or gasoline electric power crane. Steering is of the 4-wheel type controlled from a horizontal wheel. Driving power and braking are through foot-pedal control. The crane is equipped with full magnetic contactor control equipment, protected by a removable cover.

### *Vibration Isolator*

JOHNS-MANVILLE, 22 E. 40th St., New York, N. Y., has introduced an easily installed vibration isolator designed to control machine vibration and reduce the resulting noise. Known as the J-M controlled spring isolator, this is for use with equipment where vibration and excessive motion creates noise, tends to wear out machine parts, and damage connections, as well as crack the supporting walls and floors. Working parts of this unit consist of a coil spring and a rubber load pad which support the equipment and isolate vibration, and an adjustable rubber snubber inside the base to control excessive motion.

The isolator is made in two sizes: light duty, for loads from 60 to 190 lb. per isolator; and heavy duty, for loads from 250 to 720 lb. per isolator. The overall loaded dimensions of the isolator are 6 x 6 in. by 3¾ in. high. The device is inclosed in a metal jacket to protect the rubber parts.


# *You Can Cool Water to* 32° *With This Unit*



Cutaway view showing placement of cooling sections in tank. Arrows indicate short refrigerant gas flow.

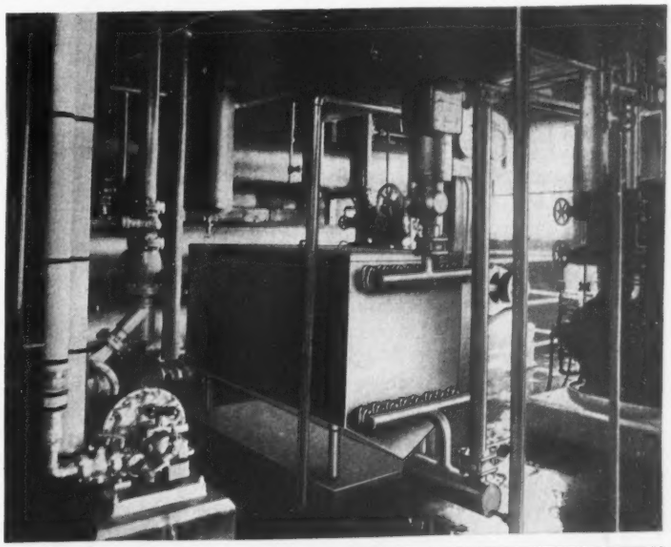
HERE'S a unit that not only cools water to 32° in a split-second with no danger of the cooling sections freezing up—but maintains the 32° temperature *constantly!*

You get this unusual performance with a Jensen Chilled Water Unit because of its patented "short gas flow" principle which permits the *swift* escape of refrigerant gas . . . enables you to use higher-temperature refrigerants . . . and lightens the load on the compressor. *It's ideal to use when your compressor is under-capacity!*

Jensen Chilled Water Units may be operated on the recirculating principle, or on a "once-over" basis. They can be built to handle 300 tons down to a fraction of a ton, and any storage capacity you wish can be provided.

Save money by cooling the "Jensen way." Write for bulletin 48. **Jensen Machinery Company, Inc., Bloomfield, N. J.; Chicago, Ill.; Oakland, Calif.**

JENSEN



Jensen Recirculating Chilled Water Unit installed in Gordon Baking Company's Salamanca, N. Y., plant. Unit contains eight cooling sections handling up to 62.5 tons of refrigeration per hour.

**JENSEN CHILLED WATER UNITS**

# Food Technology

## NEW DISCOVERIES & INVENTIONS

### Correction

***Gelatine and Sodium Alginate To Stabilize Ice Cream***

A TYPOGRAPHICAL ERROR appeared in a digest item published in the third column on page 94 of the April, 1940, issue of FOOD INDUSTRIES. The second sentence in the last paragraph on the page should read as follows:

"The addition of about 0.3 percent of sodium alginate (Daraloid) to a 12 percent mix gives approximately the same stabilizing effect as that obtained with 0.35 percent of a 225 Bloom gelatine (instead of 0.25 percent of a 225 Bloom gelatine)."

Please change the figure in your file copy.

## FOOD TECHNOLOGY

***Sanitary Significance of Coliform Bacteria In Food Control***

AT PRESENT, coliform bacteria represent the only bacterial group which can be used with a reasonable degree of accuracy as a measure of pollution in food or water, or as an indication of insanitary conditions surrounding food production.

Indiscriminate condemnation of all foods containing coliform bacteria as being polluted and being a potential danger to health is not justified. The history of sanitary control of water, oysters and milk has shown that the sanitary significance of these bacteria in foods must be evaluated in the light of all knowledge available concerning the source of the commodity as well as methods of production and handling peculiar to the particular class of food under control. An explanation of the possible sources and routes of contamination is fully as important as the knowledge of the identity of the organisms present for laying a basis for the interpretation of the significance of members of the group as a whole or of genera or species within the group.

Distinct limitations are imposed on this interpretation in the case of foods which may, by reason of conditions surrounding their production, normally contain certain members of the coliform group, such as garden vegetables, eggs and dairy products in general.

Occurring in some food products, certain organisms of the species *Escherichia coli* are directly or indirectly of fecal origin, and may be accepted as substantial evidence of excretal contamination.

The sanitary quality of drinking water is generally expressed in terms of the coli group as a whole, although cautious interpretation in the light of other evidence is recommended. In high count raw milk the presence of coli bacteria is of little significance; in pasteurized milk, however, it indicates faulty processing or recontamination, especially if the bacteria belong to the *Escherichia-aerobacter* group. In the control of crab meat production, all members of the coliform group are not necessarily of equal importance, but bacteria of intestinal origin usually point to insanitary conditions or practices. Therefore, sanitary significance is attached especially to the presence of *Escherichia coli* in crab meat.

Indications that the presence of these organisms on shelled nut meats and fish fillets may be closely correlated with improper handling make it appear that similar application of the coliform test can be made to other foods.

Digest from "Uses and Limitations of the Coliform Group in Sanitary Control of Food Production." by A. C. Hunter, *Food Research* 4, 531, 1939.

***Coli Bacteria in Nut Meats***

THE PRESENCE of *Escherichia coli* and other bacteria of the colon-aerogenes types in nut meats may point to these products as a potential source of filth diseases. Nuts in the unbroken shell do not contain any members of this group.

*Escherichia coli,* however, was found in from 4 to 45 per cent of retail samples purchased in paper bags over the counter. Also in samples representing practically every stage in the shelling operation from domestic commercial shelling plants in from 6 to 68 per cent; and in imported nut meats in from 14 to 62 per cent of the samples.

At room temperatures, these bacteria remained viable for 68 days in artificially contaminated nut meats. When large numbers of *Escherichia coli* were present, correspondingly large numbers of *Aerobacter oerogenes* and similar bacteria were found.

Digest from "Bacteria of the Colon-Aerogenes Group on Nut Meats" by M. Ostrolenk and A. C. Hnter, *Food Research,* 4, 453, 1939.

## FOOD ENGINEERING

***Vinylite Resins For Container Linings***

ADEQUATE PROTECTION of quality in packaged goods frequently necessitates a separation of the product from the actual packing material. This is achieved either by applying surface-coating films to cans or similar containers or by first wrapping the food in an inner liner. Mechanical strength and high resistance against physical or chemical agents are essential requirements for these materials. In paints and varnishes these properties are developed after application by means of chemical reaction, whereas in lacquers they are fully developed during the manufacturing process.

Vinyl resin coatings, synthesized from gas, water, air and salt by copolymerization, are ideally suited for application to food containers because they are nontoxic, odorless, tasteless and resistant to grease, alcohol and water, as well as immune to bacterial and enzymatic attack. One of the most widely used members of this group is a copolymer of approximately 87 per cent vinyl chloride and 13 per cent vinyl acetate which is sold commercially under the tradename "Vinylite" resin VYHF. Vinyl resin lacquers may be applied by spraying or roll coating, having no tendency to string or cobweb. In can manufacture their toughness and flexibility permit the coating of the end stock in the flat, before stamping out the ends. Their thermoplastic character gives them heat sealing properties. Usually it is desirable to bake the coatings to improve adherence and expel residual solvents.

Many surfaces are inert, but zinc, tin plate and iron, and, to a lesser degree, other metals, appear to accel-

erate the thermal decomposition of the resin. Vinyl finishes applied over these surfaces, therefore, must be stabilized or else separated from the metal by means of a neutral undercoat.

The behavior of the vinyl resin films over different metals is intimately related to the protective value of the coating. The nature of the metal surface determines the minimum thickness of the film. Minimum coating weights for continuous films over iron, aluminum and tin plate are in the order of 10, 6 and 3 mg. per square inch for equivalent protective value.

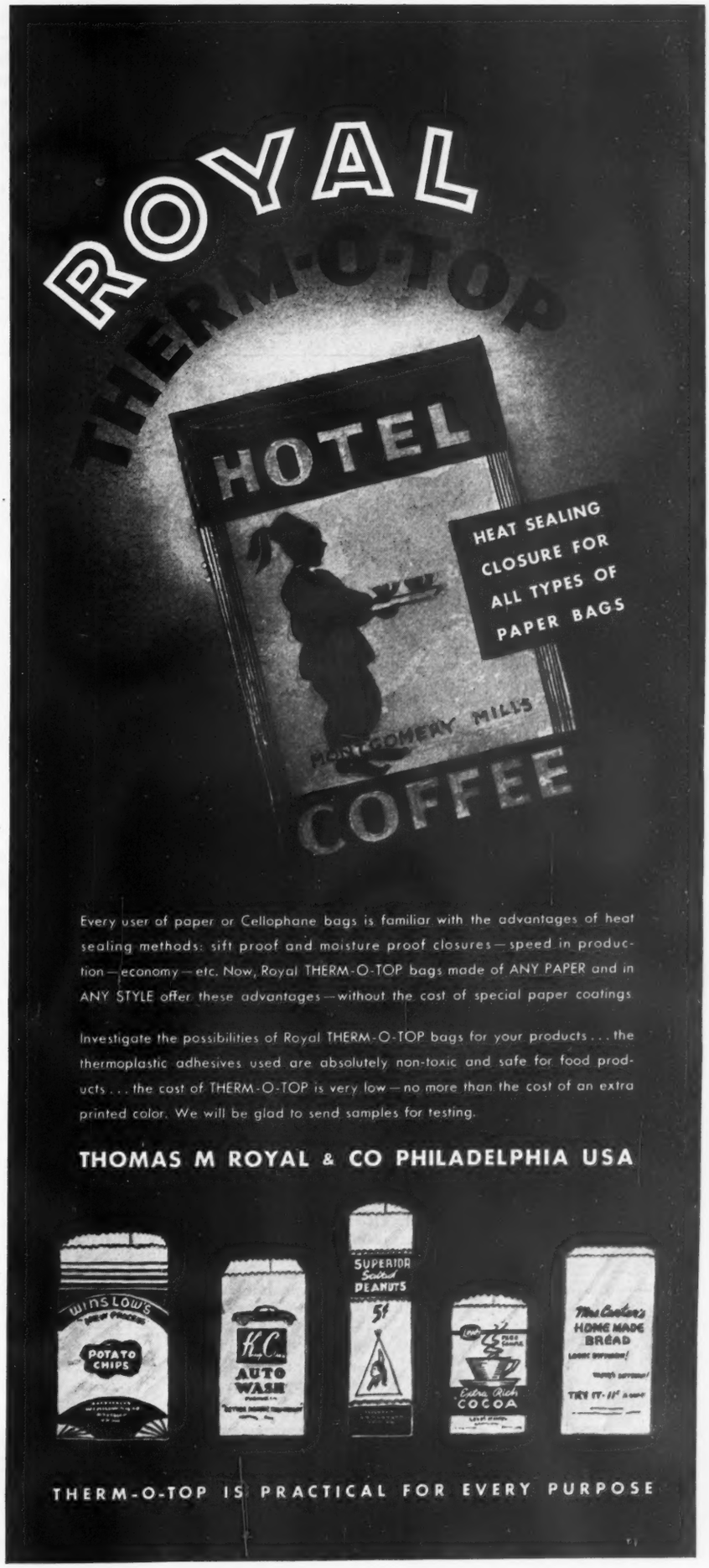
First applied successfully as a coating for beer barrels and beer cans, these vinyl resins are now used in the canning of wine, grape juice, apple juice and similar products. Their resistance to grease, acidity, alkalinity and alcohol suggests many potential outlets in the field of food containers, such as containers for carbonated beverages, citrus fruit juices, essential oils and soft drink concentrates. They also have possibilities as a lining for metal beer barrels and for tank cars for shipping wine. Further important applications are in the protection of caps and closures for food, cosmetic and medicinal products, and as a coating for wrapping papers, inner liners and closure liners.

Digest from "Vinylite Resins for Can and Container Coatings," by A. K. Doolittle, News Edition, *Industrial and Engineering Chemistry*, 18, 303, 1940.

## BAKERY PRODUCTS

### *Determining Rye Bread Aroma*

DIACETYL and acetoin are not deciding factors in the aroma of rye bread, as they are in wheat bread. A systematic effort was made to isolate the aroma principle from rye bread. Steam distillation failed, largely because the pulp of bread in water offered too much resistance to the passage of steam. Experiments were therefore made with extraction solvents. The most effective was found to be pure acetone-free methanol. Large loaves (4.5-lb.) of rye bread, two or three days old, were extracted with the solvent. The characteristic flavor and aroma was particularly strong in these samples. The methanol extracts were concentrated and fractionated again and again. Chemical analysis of the final fractions did not give complete identification of the aroma principle but did serve to identify hydroxymethylfurfural as a component. A drop of this substance in water gives a strong odor of rye bread. The substance is colorless and


ROYAL
THERM-O-TOP
HOTEL
HEAT SEALING CLOSURE FOR ALL TYPES OF PAPER BAGS
MONTGOMERY MILLS
COFFEE
Every user of paper or Cellophane bags is familiar with the advantages of heat sealing methods: sift proof and moisture proof closures—speed in production—economy—etc. Now, Royal THERM-O-TOP bags made of ANY PAPER and in ANY STYLE offer these advantages—without the cost of special paper coatings
Investigate the possibilities of Royal THERM-O-TOP bags for your products . . . the thermoplastic adhesives used are absolutely non-toxic and safe for food products . . . the cost of THERM-O-TOP is very low—no more than the cost of an extra printed color. We will be glad to send samples for testing.
THOMAS M ROYAL & CO PHILADELPHIA USA
WINSLOW'S
POTATO CHIPS
K.C.
AUTO WASH
SUPERIOR Salted PEANUTS
5¢
Extra Rich
COCOA
Mrs. Cooker's
HOME MADE
BREAD
THERM-O-TOP IS PRACTICAL FOR EVERY PURPOSE

highly volatile. Probably the aroma principle of rye bread contains other substituted furfurals.

Digest from "Studies of Bread Aroma, II—Isolation of Rye Bread Aroma Substances," by E. Komm and G. Lehmann, *Z. Unters. Lebensm.* **79**, 241, 1940 (Published in Germany).

## BEVERAGES

### *"Needling" the Ersatz Coffee*

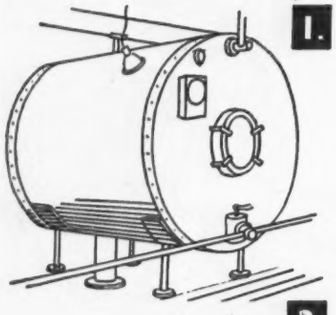
CEREAL OR MALT BEVERAGES in imitation of coffee have a higher content of extractives, hence require less raw material. Thus, coffee beans contain 25 to 30 percent of water-soluble matter, whereas malt coffee contains 45, barley coffee slightly over 50, and fig coffee a little more than 70 percent.

One objection to coffee substitutes is that they do not relieve fatigue as does coffee. Attempts to overcome this defect by adding small doses of certain adrenaline derivatives were unsuccessful, partly because individual sensitivity to these drugs varies too much and partly because their effect lasts too long. The other logical expedient is to caffeinize coffee substitutes. Caffeinized cocoa has been used in the German army, and even coffee has been fortified above its normal caffeine content. But this expedient also is limited by the bitter taste of caffeine, which is not masked by coffee aroma in the substitutes as it is in real coffee. The natural caffeine content of coffee as a beverage may be in the neighborhood of 1 percent. If it is raised to 2 percent bitterness becomes conspicuous and milk must be added to make the beverage palatable. In coffee substitutes the bitterness threshold is much lower.

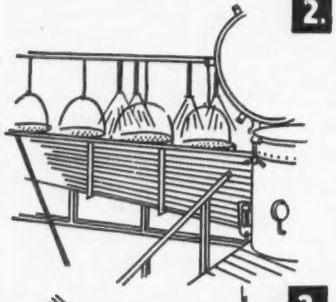
Digest from "Considerations Involved in Making Caffeinized Beverages From Domestic Raw Materials," by Oskar Eichler, *Deutsche Medizinische Wochenschrift* 66, 176, 1940 (Published in Germany).


# USE HTH PRODUCTS*

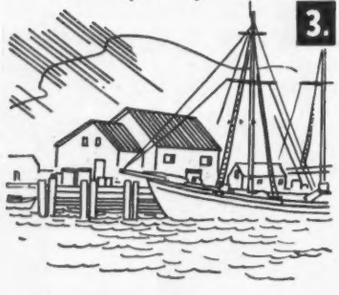
*To Cut Spoilage Loss, Guard Quality*



**1.** Keeping milk storage tanks, tank trucks, tank cars, etc. sweet and germ-free is a job for which dependable chlorine sterilizers like HTH Products are ideally suited. No danger of expansion strains, no breakage (of glass-lined tanks), no loss of time in allowing equipment to cool—as when steam sterilization is used.



**2.** In canneries, the tiniest imperfection in cans may result in contamination of the product by the water in cooling equipment. Cooling water should therefore be kept safe by maintaining a constant residual of available chlorine in the water. HTH Products contain available chlorine in convenient form ranging in concentration from 15% to 70%.



**3.** Sanitation problems in the fish industry fall naturally into three divisions—(1) purification of plant water supplies, (2) disinfecting and deodorizing containers and equipment, and general plant sanitation, and (3) disinfecting and deodorizing wharves and the decks and holds of fishing vessels. For all these uses, HTH Products offer a convenient means of effective sanitation.

**Dairies, canneries—any and all plants that deal with perishable products—face the same hazard of heavy financial loss due to bacterial contamination.**

**It doesn't pay to gamble with germs—especially when you can combat spoilage by this simple, economical, thoroughly effective means.**

**Use HTH Products. These famous chlorine sterilizers come to you in convenient powder form. Added to water, HTH Products make fast-killing hypochlorite solutions that keep their strength and are *dependable* in germicidal action. So economical, you can use freely to flush, spray or wipe all surfaces that come in contact with food or beverage products.**

**Send today for full information about HTH Products and their use.**

HTH PRODUCTS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND STREET, NEW YORK, N. Y.

*HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . DRY ICE . . . CARBONIC GAS . . . AMMONIA, ANHYDROUS and AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS FUSED ALKALI


## CANNING & PRESERVING

### *Texture of Tomatoes Improved by Calcium*

ADDITION of calcium in the form of calcium chloride to canned tomatoes increases the firmness of the tomato meat, improves its texture and decreases the loss between fill-in and drained weight.

A concentration of 170 p.p.m. of calcium in the tomato markedly improves firmness and is sufficient to prevent excessive losses in drained weight, higher concentrations having little additional effect on the latter. With 340 p.p.m. the fruit retains its shape, enough to permit slicing, without becoming tough or injuring the flavor. Tomatoes increased to 510 p.p.m. are tough and fibrous, the flavor being off and somewhat astringent.

The calcium chloride is added either dissolved in a small amount of the juice or the tomatoes are immersed for one minute into water containing 500 p.p.m. calcium, rinsed in clear water and canned. Dipped tomatoes lack uniformity.

The effect of calcium treatment is most apparent in higher quality packs. In the case of extra-standard the improvement in firmness and drained weight might be sufficient to prevent loss of a grade due to breakdown.

Digest from "The Effect of Added Calcium on Tomatoes," presented by D. Godfrey before the National Canners Convention at Chicago, January, 1940.

### *Canned Fruit Juices*

PASTEURIZATION still holds the field as a method for preserving canned fruit juices. Such antiseptics as are permitted by law are likely to impair the delicate flavor and aroma of the juice, electro-chemical methods require

costly equipment and complicated processing, and oligodynamic treatment is limited in applicability. On the other hand, freezing is a method which shows promise of important development.

The Carvallo sterilizer, used in France, greatly accelerates heat transfer by rotating the cans; the interior reaches the sterilizer temperature within a few minutes. The difference in heat penetration between rotating and stationary cans is more pronounced in No. 2 than in No. 1 cans. Thus, at 60 r.p.m. the interior reached 100 deg. C. in about 5 minutes, at 20 r.p.m. in about 25 minutes, while in a stationary No. 2 can the temperature rose only to about 70 deg. C. in 25 minutes. Among flash pasteurizers, the Jouan type is especially designed for fruit juices (Etablissement Jouan, Paris).

Analyses of canned Morocco orange juice show good retention of ascorbic acid (vitamin C) in cold storage and at room temperature, but considerable loss after several months at 37 deg. C. Byproduct utilization is important, leading examples being pectin from apples and citrus fruits, oils from grape and tomato seeds, and stock feed from tomato wastes.

Digest from "Canned Fruit Juices," by H. Cheftel, *Chimie et Industrie*, **42**, 425, 1939 (Published in France).

## DAIRY PRODUCTS

### *Chlorine Rinse Removes Bacteria*

BACTERIAL CONTROL of farm milk utensils can be greatly improved by applying a chlorine rinse of proper concentration just before using the previously thoroughly cleaned containers for the handling of milk. This treatment, which destroys bacteria that may have accumulated in the interval between washing and use, is very effective as well as inexpensive, requiring only 3 to 4½ lb. of chlorine powder per year for a herd of 30 cows. It is approved by milk plants and health officers.

Digest from "Chlorine Rinse Reduces Bacteria at Low Cost," by J. W. Yates, *Journal of Milk Technology* **2**, 235, 1939.

### *Cooked Flavor in Milk and Iron Contamination*

TRACES of ferrous iron added to milk hasten the formation of a tallowy oxidized flavor. Whether the iron be added before or after the heat treatment, this can be prevented by flash heating of the milk to at least 176-180 deg. F. Such heating causes the development of a cooked flavor, due to the liberation of sulphides. These act as reducing agents and counteract the oxidizing action of the iron. They continue to do so on storage, but are not effective against traces of copper which will destroy the cooked flavor on 48 hours storage.

Digest from "Cooked and Oxidized Flavors of Milk as Affected by Ferrous Iron," by I. A. Gould, *Journal of Dairy Science*, **22**, 1017, 1939.

### *Extracting Whey Powder With Alcohol*

THE POWDER formed by drying whey or milk serum yields lactose and a useful protein powder when extracted with ethyl alcohol. The preferred strength of alcohol is 70.7 per cent since there is a very narrow range of strength in which the solubility of the whey proteins in water is not altered.

The extraction method recovers 80 per cent of the lactose, in excellent quality and crystalline form. The protein powder remaining from the extraction contains 50 per cent protein, 15 per cent ash and 45 per cent of heat-volatile solids. The process is also applicable to condensed or powdered skim milk.

When 95 per cent alcohol is used, the extraction and recrystallization of

Standardize with
TRI-CLOVER
Sanitary Fittings and Pumps

The Tri-Clover Line is definitely the leader in its field. A large majority of dairy equipment houses stock and recommend Tri-Clover products.

We are specialists in sanitary fittings and pumps. We manufacture and maintain in stock every conceivable type of sanitary fitting . . . in nickel alloy, plated bronze and stainless steel. Tri-Clover fittings and pumps are easily disassembled for thorough cleaning. No inside pockets or crevices to hold bacterial deposits . . . no rust or corrosion . . . this type of fitting will save you money.

Let our engineers help you modernize and economize with Tri-Clover Sanitary Fittings and Pumps. Write for prices and complete information.

Try TRI-CLOVER
"THE Complete LINE"

TRI-CLOVER MACHINE COMPANY
KENOSHA • WISCONSIN
*World's largest manufacturer of stainless steel sanitary fittings*

lactose are effected much more rapidly than with 70.7 per cent alcohol and the lactose is extraordinarily pure, but such a large volume of alcohol is required (about 10 gal. per pound of milk powder) that the process is not feasible for commercial production.

Digest from "Recovering Lactose and Soluble Protein from Whey by Alcohol Extraction," by G. Genin, *Le Lait* 19, 693, 1939 (Published in France).

## FISH

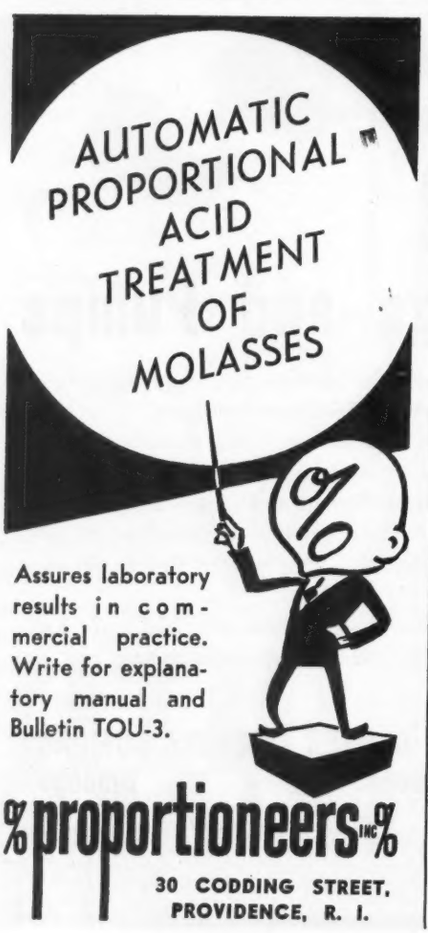
### *Germicidal Ice*

BACTERIAL SPOILAGE is checked more efficiently in dressed halibut, pink salmon and black cod when these fish are packed in ice containing sodium nitrite in concentrations of 0.05 to 0.1 per cent than when they are packed in ordinary or benzoic acid ice, without causing the fish to absorb excessive amounts of the preservative. Nitrites seem to owe their effectiveness to their high solubility in water, which permits rapid penetration of the fish muscle. In halibut, they cause a yellowish discoloration on the white side of the fish, but in salmon and cod there is no change in appearance.

Whereas benzoic acid ice (0.16 per cent, frozen at 31.9 deg. F.) contains the benzoic acid crystals uniformly incorporated in the ice (because it is approximately a eutectic ice), sodium nitrite is merely scattered mechanically, with a tendency to concentrate in the core. By eliminating aeration during freezing and drainage of the core, a considerable, though variable, proportion of the nitrites can be occluded in all parts of the ice block. After crushing, this distribution becomes even more uniform.

Sodium and potassium nitrites, added in concentrations of from 0.05 to 0.2 per cent to brines in which fish fillets are dipped, inhibit bacterial spoilage in fresh and subsequently lightly smoked fish to a greater extent than when similar or higher concentrations of benzoic acid or sodium benzoate are used.

Digest from "A Note on a Preservative Ice Containing Sodium Nitrite," by H. L. A. Tarr and P. A. Sunderland. Progress Reports of Pacific Biological Station, Nanaimo, B. C., and Pacific Fisheries Experimental Station, Prince Rupert, B.C., No. 41, 1939 (Published in Canada).



## FLOUR

### *How to Can Flour*

WHEN FLOUR is canned with its ordinary moisture content it does not keep well. But flour which has been vacuum dried to a moderate moisture content is stable and has been successfully kept 22 years without loss of baking quality. This canned flour also proved to be exceptionally stable against high temperatures which would damage ordinary flour.

Ordinary tin plate cans are not suitable for canning flour because direct contact of flour with the metal catalyzes oxidative spoilage, especially the development of rancidity. This difficulty can be overcome either by lining the cans with paper or by sealing the flour in the cans in vacuum. The preferred vacuum drying treatment for flour to be canned is to heat about 90 minutes in a 96 per cent vacuum while keeping the flour in motion with a paddle stirrer. Heat is applied from outside and the flour temperature is allowed to rise to about 140 deg. F. From its ordinary moisture content of about 14 to 16 per cent, the flour should be dried to not more than 8 per cent moisture. Much lower moisture content can be attained, but does not give a corresponding benefit.

One of the principal changes in stored flour is hydrolytic liberation of free fatty acids. In its early stages this change is favorable to gluten elasticity, but later the process becomes harmful. Drying the flour retards this hydrolytic action enormously. The fact that vacuum drying sterilizes the flour also contributes to its stability.

Digest from "Stabilizing Flour by Drying," by B. Thomas, *Zeitschrift für das gesamte Getreidewesen* 27, 7, 1940 (Published in Germany).

## FROZEN FOODS

### *Freezing Quality Of Irrigation-grown Fruits and Vegetables*

MOST of the irrigation-grown vegetable varieties from the Yakima and Walla Walla Valleys and other sections of the Pacific Northwest are suitable for freezing and canning if harvested at the proper stage of maturity and processed by accepted procedure.

With regard to freezing quality, peas may be grouped as follows:

1. Well adapted to freezing: green-skinned, wrinkle-seeded varieties.
2. Poorly adapted: Green-skinned, dimpled and round-seeded varieties.
3. Unadapted: pale-skinned, wrinkled, dimpled and round-seeded varieties.

Within the well-adapted group, varietal differences in color and flavor justify careful selection for commercial freezing.

Small-seeded lima beans are characterized by a poorer texture than large-seeded varieties when frozen.

Fruits seem to exhibit greater differences in canning and freezing quality than do vegetables, calling for a more cautious choice of varieties.

These are, briefly, the conclusions drawn from the results of an elaborate study conducted cooperatively at Prosser, Wash., by the Irrigation Branch Experiment Station and Home Economics Department of the Washington Experimental Station, the Frozen Pack Laboratory and the Fruit and Vegetable Products Laboratory of the U. S. Bureau of Chemistry and Soils with the collaboration of the U. S. Bureau of Plant Industry.

MC–47. U. S. Dept. of Agriculture.

## MEAT PRODUCTS

### *Ripening of Felino Sausage*

THE CHEMICAL CHANGES occurring in Felino type sausage in storage have been investigated by numerous analyses. This sausage is a meat paste, made up with 3 per cent salt and small quantities of sodium nitrate and sugar, suitably spiced. It is packed in hog casings which have been well washed with water, brine and vinegar. Ripening processes were studied by analyzing samples at intervals of a week or two for about

three months, then at the end of the fourth and eighth months.

Aside from gradual desiccation, bringing the moisture content down from about 55 per cent to 24 per cent (4 months) and finally to 20 per cent (8 months), there is first an increase and finally a decrease in total soluble matter and soluble nitrogen. This means that ripening involves a slight peptonization, accompanied by a loss of muscle glycogen, but that in the later stages of ripening there is an insolubilizing effect which probably results from loss of moisture.

The nitrate content, which is high at first, progressively decreases while the initially low nitrite content becomes greater as ripening proceeds. Toward the end of ripening, however, nitrite begins to disappear and some of the oldest samples contain little or none. The behavior of ammonia nitrogen is also significant. At first there is a slight increase, indicating degradation of protein, but ammonia nitrogen then reaches a practically constant level, indicating that the degradative processes have stopped.

Digest from "Ripening of Sausage in Casings," by M. Guastalla, *Industria Italiana Delle Conserve* 14, 115, 1939 (Published in Italy).

## PICKLING

### *New Method of Preventing Scum-forming Yeast Growth*

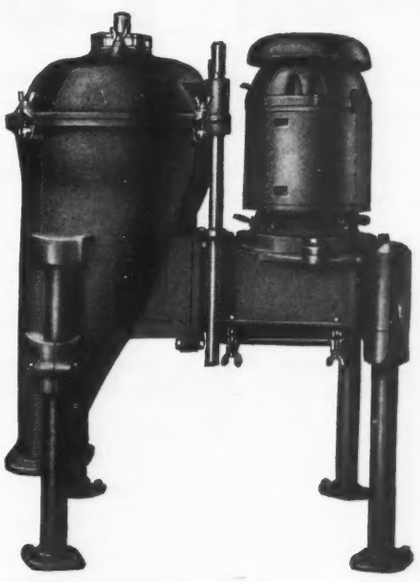
SCUM YEAST, mycoderma, one of the worst enemies of the pickle and kraut packer, uses up the acid produced by desirable bacteria and indirectly causes the spoilage of pickles and kraut. Use of solid and liquid paraffin, treatment with ultra-violet light and resort to a great many other methods to eliminate the formation of scum on pickle and kraut tanks have proved impractical or too expensive to be put into general use.

For the past three years, experiments have been made with a number of chemicals in an attempt to find one or more which would inhibit the growth not only of mycoderma but of any scum-forming microorganism. To date the work has been done with pickle brines, cider and vinegar. Emulsions of alspice, cassia, coriander, cloves, mustard and anise oils have been used, as have sodium oleate and resin oleate.

So far, oil of mustard has given the best results. The addition of one drop of mustard oil emulsion to the test container of dill pickle brine has been sufficient to prevent scum formation for a period of several weeks. Likewise, formation of "mother" on cider or vinegar has been prevented in the


No Heat! No Poison Gas!

JUST SIMPLE
MECHANICAL ACTION
ACCOMPLISHES DESTRUCTION OF ALL INSECT LIFE BY ENTOLETION



The Bulk Flour
ENTOLETER
INFESTATION DESTROYER
REG. U. S. PAT. OFF.

DESTROYS INSECT INFESTATION IN ALL STAGES: EGG, LARVA, PUPA AND ADULT, IN FINISHED FLOUR AS PART OF THE MILLING PROCESS.

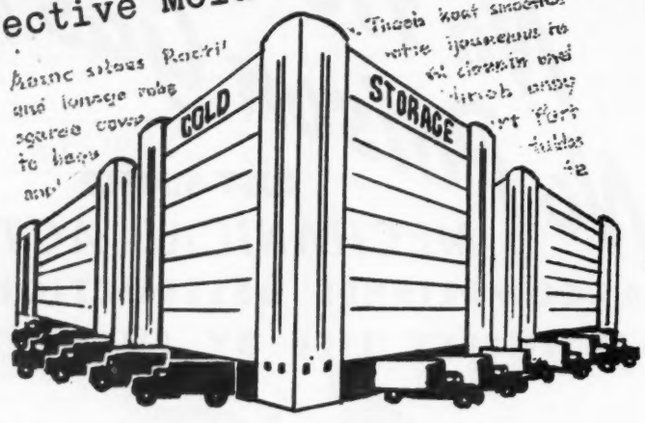
Inexpensive
Easy to install and operate
Minimum Maintenance

ENTOLETER DIVISION
THE SAFETY CAR HEATING AND LIGHTING COMPANY, INC.
230 PARK AVENUE NEW YORK, N. Y.

No. 7

RECIPE FOR FOOD PLANT SANITATION

Effective Mold Control Methods




**Mold and Bacteria Problem in Cold Storage Rooms and Quick Freeze Plants Solved by Oakite Methods**

DOES your product go into cold storage rooms? Do you operate a cold storage or quick freeze plant?

If so, then you know the importance and necessity of guarding against mold growths . . . which so frequently appear on walls and floor surfaces of cold storage rooms. But many concerns have found a successful and effective way of meeting this problem with

**OAKITE BACTERICIDE**

U. S. PATENT NO. 2,121,501 AND OTHERS

The method is simple . . . just fill open barrel or hogshead with a solution of Oakite Bactericide and place wherever mold formation occurs. The gradual vaporization of the more ACTIVE FORM of available chlorine that only Oakite Bactericide provides, effectively keeps walls and surfaces of storage rooms mold-free.

Where conditions are particularly bad, walls and floors should be first thoroughly cleaned and then sprayed with a solution of Oakite Bactericide. For further details concerning Oakite mold and bacteria control methods, let us submit helpful information based on their successful use in other food plants.

**Write Today . . . No Obligation**

Since there is no obligation . . . why not investigate the advantages that successful Oakite cleaning and germicidal methods can give you? Tell us your problem . . . we are at your service, day or night.

**OAKITE Certified CLEANING**

Complete
Nation-Wide Service
For These Industries

•

CANNING
CEREAL PRODUCTS
MEAT PACKING
SEA FOOD
BOTTLING
ICE CREAM
BAKING
DAIRY
BREWING

Manufactured only by

**OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.**

Representatives in All Principal Cities of the United States and Canada


same way. Also, production of acid by vinegar bacteria has been stopped at any point in the vinegar making process.

Mustard oil incorporated into liquid or solid parafin or impregnated into paper for putting over the brine surface has given good results in preventing scum formation. Some such method of application would be necessary to prevent scum formation in open tanks or casks. Otherwise, the mustard oil would rapidly evaporate. In closed containers, the oil might be introduced in pill or pellet form with salt or sugar as a menstrum, or by dropping the oil or an emulsion of the oil into the container before sealing.

Abstract of "A New Method for the Prevention of Scum-forming Microorganisms," by F. W. Fabian, research professor of bacteriology, Michigan State College; read before the February, 1940, Technical School for Pickle and Kraut Packers.

## MISCELLANEOUS

### *Vitamin C Enrichment of Foods*

IN COOKING, FRESH VEGETABLES retain their natural vitamin C content better than artificially added vitamin. This has been demonstrated by tests in which green beans and other vegetables were cooked one hour. From 60 to 90 per cent of the original natural vitamin C (ascorbic acid) content remained, whereas similar vegetables artificially enriched in ascorbic acid retained not more than 75 per cent, and sometimes only 10 per cent, of the added vitamin.

In fruits or fruit juices, vitamin C is still more sensitive to cooking, but without any significant difference between the natural and added vitamin. Jellies and jams retained, after cooking, only 20 to 50 per cent of the vitamin (natural or artificial) originally present.

Tests with natural and artificial honey revealed relatively high vitamin C stability, whether or not the honey was artificially enriched in the vitamin. These were storage tests, not cooking tests. From 80 to 90 per cent of the initial ascorbic acid content remained after five months. Storage tests with fruit juices showed that 70 to 85 per cent of the initial ascorbic acid content was retained after three to five months. In powdered milk the vitamin keeps indefinitely. In margarine its behavior is erratic, and further study is needed if enrichment is to be successfully practiced. In candies and in cake icing there is practically no loss of vitamin C if the mix is dried before use.

Digest from "Enriching Food Products with Vitamins," by B. Falke and G. Lemmel, *Ernährung* 4, 317, 1939 (Published in Germany).

# Books

## Testing Flour Quality

PHYSICAL TESTS OF FLOUR QUALITY. By C. H. Bailey. Published by The Food Research Institute, Stanford University, Calif. 1940. 55 pages; 8½x11 in.; paper. Price, $1.25.

Three major subdivisions of the subject are discussed: flour absorption, or the proportion of water required to produce doughs of optimum plasticity or viscosity; physical tests of crude gluten; and physical tests of wheat flour dough. The treatment is scientific and thorough to a degree worthy of the reputation of the author, an outstanding cereal chemist. The work is Vol. 16, No. 6, of *Wheat Studies of the Food Research Institute.*

## Data on Sugar Quality

REPORT OF STUDIES ON UNIFORMITY OF QUALITY OF SUGARS. Published by the Department of Agriculture, Washington, D. C. 1939. Free.

Eight extensive tables of data obtained by chemical studies of beet sugars collected during 1938 are presented in part one of this mimeographed report. Part II contains two tables of biological data on the same sugars. These tables are useful to control chemists for comparative purposes.

## Facts About Folding Boxes

FOLDING PAPER BOXES. By James D. Studley. Published by the Bureau of Foreign and Domestic Commerce. 1939. 60 pages; 5⅞x9⅛ in; paper. Price, 15 cents; for sale by Superintendent of Documents, Washington, D.C.

This pamphlet will leave its readers with a good understanding of how folding paper boxes are made and used. It covers the raw material, cutting and creasing of the paper, special treatments and printing. The different types of folding boxes and the blanks from which they are formed are illustrated. Reasons why folding cartons are used are given.

## Profit Sharing and Pensions

PROFIT SHARING AND PENSION PLANS. By C. Morton Winslow and K. Raymond Clark. Published by Commerce Clearing House, Inc., 205 W. Monroe St., Chicago, Ill. 1939. 204 pages; 6¼x9¼ in.; cloth. Price $2.

This book is arranged in two sections. The first discusses various types of pension and profit sharing plans, including illustration of their effect, suggestions for planning and résumés of specimen plans. The second part presents federal tax laws affecting pension, profit sharing and stock bonus plans—their legislative, administrative and judicial interpretation.

## Government Regulations Guide

LEGAL, POLITICAL AND BUSINESS GUIDE. By N. H. Mager. Published by Central Book Co., 245 Broadway, New York, N. Y., 1940. 221 pages; 10¼x7¼ in.; leatherette. Price, $2.

Where? Who? What? How much? How? These and many more questions asked by research departments and business men on the subjects of taxes, licenses, administrative agencies, labor laws, etc., are answered concisely. Maps, charts, tables, check lists and directories make information readily accessible. Here is offered a classified guide to government activity in the fields of business, politics and law. It covers federal, state and New York City regulations.

## How to Make and Sell Cookies

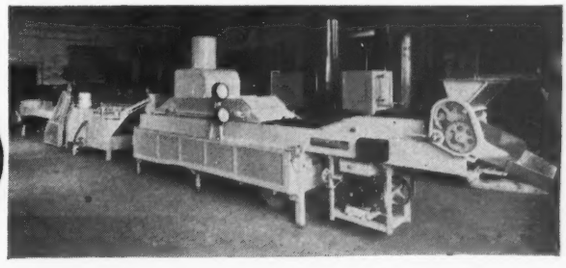
THE BOOK OF COOKIES. Published by Bakers' Helper Co., 330 S. Wells St., Chicago. 1940. 145 pages; 5⅝x8¼ in.; cloth. Price $1.

Some ideas on selling cookies and commercial recipes for many different types of cookies are contained in this little book. The information is taken from articles which appeared in *Bakers' Helper.*

## How To Use Frozen Foods

MRS. KNOWLES' COOK BOOK FOR FROZEN FOODS. By Mrs. F. W. Knowles. Published by Kane Harcus Co., Everett, Wash., 1939. 31 pages; 8¾x5¾ in.; paper. Price, 25 cents.

One way to increase consumption of a group of food products is to inform consumers of methods for preparing tasty dishes containing these products. This book does just that. It describes 66 different ways of using frozen foods, including fruits, vegetables, meats and seafoods as part of various well balanced menus with directions for freezing fresh foods. Public relations men, promotion and sales departments, and home economists in the frozen food field should find the book helpful.



**It's a fact—one machine can turn out from 50 to 350 pounds of perfect chips *per hour* if it's a—**

**FERRY AUTOMATIC CONTINUOUS POTATO-CHIP MACHINE**

**Not only does this volume put you in a position to get the bulk of the business in your locality but production costs are much lower than with other types of equipment. From raw potatoes to tender, crisp, golden chips the entire process is wholly automatic except for inspection of the peeled potatoes. . . . No wonder operators of Ferry Potato Chip and Julienne machines throughout the country are both enthusiastic and prosperous! If the idea looks good to you write us today for complete details.**

*Also Makers Of:*

SLICERS & AUTOMATIC SLICER FEEDERS

CAN WASHING MACHINERY

PRETZEL COOKERS

PRETZEL STICK MACHINES

All Types of Special Conveyors

**J. D. FERRY CO.** 129 So. Cameron Street HARRISBURG, PA.

# Patents

**Gelatin Given Improved Setting Properties by Treatment With Hydrates of Phosphorous Pentoxide, Salts of Its Hydrates, Molybdates, Polymolybdates, Tungstates, Polytungstates, Phosphotungstic Acid, Phosphotungstates, Phosphomolybdic Acid and Phosphomolybdates**—Donald P. Grettie, Chicago, Ill. No. 2,196,300. April 9, 1940.

**Deep-fat-cooked Food Propelled Through Cooking Vat and Automatically Discharged by Helicoidal Screw Housed in Vat With a Cylindrical Bottom**—Juan Galban y Carlo, Havana, Cuba. No. 2,196,353. April 9, 1940.

**Puffed Cereals Given a Candy Coating Made by Cooking Together Sugar, Water and a Fat at Not Higher Than 230 Deg. F.**—John L. Kellogg, to Helen L. Kellogg, Chicago, Ill. No. 2,196,395. April 9, 1940.

**Fish Frozen in a Brine Refrigerating Plant on Board Ship and Stored in Frozen State**—Johannes Reeh, Chatenay-Malabry, France. No. 2,196,643. April 9, 1940.

**Chewing Gum Made From Base Containing an Olefine-diolefine Resin**—George A. Hatherell, Roscoe, Calif., to Frank A. Garbutt, Los Angeles, Calif. No. 2,197,240. April 16, 1940.

**Potatoes and the Like Loaded in Railroad Cars Conditioned for Temperature and Moisture Content**—Frank J. Reilly, Miami, Fla., to General American Precooling Corp., Chicago, Ill. No. 2,197,437. April 16, 1940.

**Vinegar Made From Dextrose Solution**—Rolland F. Cohee, Jr., Ames, Iowa, to Corn Products Refining Co., New York, N. Y. No. 2,197,517. April 16, 1940.

**Chewing Gum Made to Contain Lanolin and Jelutong**—Herbert W. Conner, to Wm. Wrigley Jr. Co., Chicago, Ill. No. 2,197,718. April 16, 1940.

**Chewing Gum Made to Contain Chicle and Phosphatide**—Herbert W. Conner, to Wm. Wrigley Jr. Co., Chicago, Ill. No. 2,197,719. April 16, 1940.

**Conditioner for Untreated Flour Made by Mixing a Dextrine, a Malted Cereal Flour With Low Moisture Content and a Partially Dextrinized Cereal Flour Treated to Alter Its Gluten Content**—Hans F. Bauer, Chicago, and Bruce W. Thayer, Evanston, Ill., to Stein Hall Manufacturing Co., Chicago, Ill. No. 2,197,784. April 23, 1940.

**Lactose-containing Solutions Concentrated to 92 Percent Solid Content, Seeded With Lactose Crystals, Cooled to Cause Crystallization and Heated to Dry**—Charles O. Lavett, to Buffalo Foundry & Machine Co., Buffalo, N. Y. No. 2,197,804. April 23, 1940.

**Bakery Products Wet Mix Made by Homogenizing a Mixture of Eggs, Sugar, Shortening and Liquid and Packaging for Future Use Without Sterilization**—William R. Voss, Milwaukee, Wis. No. 2,197,820. April 23, 1940.

**Honeycombed or Hole-containing Candy Made in a Continuous Manner by Mechanical Means**—Jacob Warren Bowman, Cynwyd, Pa., to Gum, Inc., Philadelphia, Pa. No. 2,197,919. April 23, 1940.

**Popped-corn Confection Made by Mixing Mechanically the Popped Corn and the Candy Floss**—Charles H. Cooley and Reginald B. Smith, Wichita, Kan. No. 2,198,152. April 23, 1940.

**Oil and Fat-containing Foods Stabilized Against Rancidity by Addition of a Slightly Acidified Water Extract Concentrate of an Unbleached Cereal Containing Added Starch**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,197. April 23, 1940.

**Oil- and Fat-containing Foods Stabilized Against Rancidity by the Addition of a Slightly Acidified Water Extract Concentrate From an Unbleached Cereal Containing Skimmed Milk Solids**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,198. April 23, 1940.

**Fat- and Oil-containing Foods Stabilized Against Rancidity by Addition of Alcohol Extract of Finely Divided Unbleached Cereal in Dried State and Containing Added Sugar and by Finally Heating to at Least 145 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,199. April 23, 1940.

**Foods Subject to Oxidative Deterioration Stabilized by the Addition of Alcohol Extract of Finely Divided Unbleached Seeds in Concentrated Form Containing Added Sugar and by Finally Heating to at Least 145 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,200. April 23, 1940.

**Foods Subject to Oxidative Deterioration Stabilized by the Addition of Small Quantity of Slightly Acidified Water Extract of Unbleached Corn Germ and Oat Germ and Finally Heating to Higher Than 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,201. April 23, 1940.

**Organic Materials Subject to Oxidation Stabilized by Adding Less Than 5 Percent of Fiber-free Antioxygens Extracted From Unbleached Cereal Grasses and by Finally Heating to at Least 215 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. Nos. 2,198,202 and 2,198,203. April 23, 1940.

**Fat- and Oil-containing Foods Stabilized Against Rancidity by Adding Slightly Acidified Water Extract of De-oiled Soya and Heating to Higher than 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,204. April 23, 1940.

**Toasted Whole-wheat Breakfast Cereal Stabilized by Addition of Concentrated Slightly Acidified Water Extract of Unbleached Oats, Corn and Barley and by Heat Treating From Drying to Toasting Temperatures**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,205. April 23, 1940.

**Roasted Coffee Given Improved Quality by Coating With Water-soluble Extract of a Cereal Immediately After Roasting and While Still Having a Temperature of 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,206. April 23, 1940.

**Roasted Coffee Stabilized by Coating with Green Coffee Bean Flour in Aqueous Dispersion Immediately Following Roasting and While Still Having a Temperature Above 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,207. April 23, 1940.

**Refined Cottonseed Oil Stabilized Against Rancidity by Addition of Less Than 5 Percent of a Half-and-half Mixture of Sugar and Lecithin and by Heating to Higher Than 180 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,208. April 23, 1940.

**Meats Stabilized Against Oxidative Deterioration by a Surface Treatment With a Mixture of Sugar and a Phosphorus-containing Material Such as a Phosphatide or Phosphoric Acid Before Packaging and by Heating to at Least 200 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,209. April 23, 1940.

**Oils Normally Subject to Oxidative Deterioration Stabilized by Adding a Small Amount of Crude Sugar, Either Cane or Beet**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,210. April 23, 1940.

**Fats and Oils Given Improved Keeping Qualities Through Treatment of High-fat-containing Meats With Small Quantities of Sugar and Heating to Above 215 Deg. F. for Rendering of Oil and Fat**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,211. April 23, 1940.

**Fats and Oils Containing More Than About 0.1 Percent Total Phosphatide Stabilized Against Oxidative Deterioration by Mixing With Less Than 3 Percent of Dextrose and Heating to Higher Than 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2, 198,212. April 23, 1940.

**Oils and Fats Stabilized Against Rancidity by Adding Small Amount of Sugar and Phosphatide Mixture to the Continuous Water Phase of a Dispersion Containing the Oils and Fats in the Dispersed Phase and Heating to More Than 220 Deg. F., Breaking the Dispersion and Separating the Stabilized Oils**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,213. April 23, 1940.

**Carotene Content of Freshly Cut Grasses Stabilized by Addition of Sugar and Phosphatide Mixture and Heating to About 250 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,214. April 23, 1940.

**Refined Fats and Oils Stabilized Against Oxidative Deterioration by Being Mixed and Dispersed with a Relatively Small Amount of Dried and Finely Divided Milk Solids Not Fat and Heating to Char the Added Milk Solids**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2, 198,215. April 23, 1940.

**Butter Stabilized Against Oxidative Deterioration by Adding 3 Percent Powdered Skim Milk in Dispersed State Through Cream Containing 30 to 35 Percent Butterfat, Heating to About 170 Deg. F. for About 6 Min., and Churning to Make Butter**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,216. April 23, 1940.

**Cream and Cream-containing Milk Stabilized Against Oxidative Deterioration by Addition of Added Milk Serum Solids and Heating Above 145 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,217. April 23, 1940.

**Wheat-germ Preparation Stabilized Against Oxidative Deterioration by Addition of Small Amount of Milk Solids Not Fat Which Before Drying Has Been Heated to at Least 170 Deg. F.**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y., No. 2,198,218. April 23, 1940.

**Seeds and Nuts Containing Over 40 Percent Oil Ground to Form Substantially Water-free Oily Paste, Heated to at Least 250 Deg. F. for Short Time and Then Expressed for Recovery of Highly Stabilized Oils**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,219. April 23, 1940.

**Peanut Butter Stabilized by Being Made to Contain Less Than 25 Percent of Ground Unroasted Peanuts**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,220. April 23, 1940.

**Cocoa Butter Added in Small Quantity to Glyceride Oils and Fats For Stabilization Against Oxidative Deterioration**—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,198,222. April 23, 1940.

**Beer Packaged and Shipped in an Enamel-lined Double-walled Sheet-metal Barrel**—Erik G. Nyberg, to A. O. Smith Corp., Milwaukee, Wis. No. 2,198,315. April 23, 1940.

**Grain Washed and Tempered to Not More Than 3 Percent Surface Moisture While Passing Through a Zone of Centrifugal Agitation**—John M. Baer, Chicago, Ill., to the Guardite Corp. No. 2,198,597. April 30, 1940.

**Pie Crust Edges Mechanically Sealed While Filled Pan is Passing Under Crimping Machine in a Rotary Manner**—John Romanoff, to Jones Pies, Inc., Elizabeth, N. J. No. 2,198,705. April 30, 1940.

**Coffee Decaffeinated by Heating Raw Beans in Water in the Presence of an Absorption Agent**—Eugen Bürgin, to Max Brunner & Co., Schaffhausen, Switzerland. No. 2,198,859. April 30, 1940.

**Liquid Fats and Fat Emulsions Cooled While Passing Through Space Enclosed With an Exterior Cooling Jacket and an Interior Rotating Drum Through Which Flow Cooling Media**—John Brix-Hansen, Lyngby, Denmark. No. 2,199,038. April 30, 1940.

**Animal and Vegetable Oils Refined for Removal of Free Fatty Acids and Coloring Matter by Mixing With an Alkaline Reagent at a Temperature Sufficiently High to Neutralize the Free Fatty Acid Without Formation of a Stable Emulsion, Promptly Cooled to Below 100 Deg. F. for Removal of Color**—Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nev. No. 2,199,041. April 30, 1940.

**Citrus Fruits Divided Into Skin-free Juice Cell Divisions by Centrifugal Force**—Ralph Polk, Sr., Miami and Ralph Polk, Jr., Haines City, Fla., to Polk Development Co., Tampa, Fla. No. 2,199,345. April 30, 1940.